IBM Tivoli Storage FlashCopy Manager
Version 4.1.2

*Installation and User's Guide
for Windows*

IBM

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> **Note:**
> Before you use this information and the product it supports, read the information in "Notices" on page 415.

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About this publication

IBM® Tivoli® Storage FlashCopy® Manager provides the tools and information that are needed to create and manage volume-level snapshots while the applications that contain data on those volumes remain online.

Throughout this document, the term *Windows VSS System Provider* (unless otherwise specified) refers to the standard Windows System provider.

Since the previous edition, changes are marked with a vertical bar (|) in the left margin.

Who should read this publication

This publication is intended for administrators who are responsible for implementing a backup solution in database server environments.

It is assumed that you understand the following storage systems, operating systems, or applications, as applicable:

- The storage system that is used for the database:
  - Any storage devices that implement the VSS provider interface.
  - IBM System Storage® DS3000, DS4000®, DS5000™
  - IBM System Storage SAN Volume Controller
  - IBM Storwize® V7000
  - IBM XIV® Storage System
  - IBM System Storage DS8000®™ series
- Windows operating system
- Microsoft Volume Shadow Copy Service (VSS)
- Microsoft Exchange Server
- Microsoft SQL Server
- Active Directory

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 www.ibm.com/support/knowledgecenter.

Reading syntax diagrams

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.
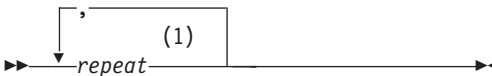
- The ►►— symbol indicates the beginning of a syntax diagram.
- The ⟶ symbol at the end of a line indicates the syntax diagram continues on the next line.
- The ►— symbol at the beginning of a line indicates a syntax diagram continues from the previous line.
- The ⟶◄ symbol indicates the end of a syntax diagram.

Syntax items, such as a keyword or variable, can be:

- On the line (required element)
- Above the line (default element)
- Below the line (optional element)

Syntax diagram description	Example
Abbreviations: Uppercase letters denote the shortest acceptable truncation. If an item displays entirely in uppercase letters, it cannot be truncated. You can type the item in any combination of uppercase or lowercase letters. In this example, you can enter KEYWO, KEYWORD, or KEYWOrd.	►►—KEYWOrd————————————►◄
Symbols: Enter these symbols exactly as they display in the syntax diagram.	* Asterisk { } Braces : Colon , Comma = Equal Sign - Hyphen () Parentheses . Period ' Single quotation mark Space " Quotation mark
Variables: Italicized lowercase items (*var_name*) denote variables. In this example, you can specify a *var_name* when you enter the KEYWORD command.	►►—KEYWOrd—*var_name*————————►◄

Syntax diagram description	Example

Repetition:

An arrow that returns to the left means you can repeat the item.

```
     ┌──────────┐
     │          │
►►───▼──repeat──┴──────────────────────►◄
```

A character or space within an arrow means you must separate the repeated items with that character or space.

```
     ┌────,─────┐
     │          │
►►───▼──repeat──┴──────────────────────►◄
```

Required Choices:

When two or more items are in a stack and one of them is on the line, you must specify one item.

```
►►─┬─A─┬───────────────────────────────►◄
   ├─B─┤
   └─C─┘
```

In this example, you must choose A, B, or C.

Optional Choice:

When an item is below the line, that item is optional. In the first example, you can choose A or nothing at all.

```
►►─┬───┬───────────────────────────────►◄
   └─A─┘
```

When two or more items are in a stack below the line, all of them are optional. In the second example, you can choose A, B, C, or nothing at all.

```
►►─┬───┬───────────────────────────────►◄
   ├─A─┤
   ├─B─┤
   └─C─┘
```

Defaults:

Defaults are above the line. The default is selected unless you override it. You can override the default by including an option from the stack below the line.

```
   ┌─A─┐
►►─┼───┼───────────────────────────────►◄
   ├─B─┤
   └─C─┘
```

In this example, A is the default. You can override A by choosing B or C. You can also specify the default explicitly.

Repeatable Choices:

A stack of items followed by an arrow that returns to the left means you can select more than one item. In some cases, it means you can repeat a single item.

```
     ┌───,───┐
     │       │
►►───▼─┬─A─┬─┴──────────────────────────►◄
       ├─B─┤
       └─C─┘
```

In this example, you can choose any combination of A, B, or C.

Syntax Fragments:

Some diagrams because of their length, must fragment the syntax. The fragment name is displayed between vertical bars in the diagram. The expanded fragment is displayed between vertical bars in the diagram after a heading with the same fragment name.

```
►►─┤ The fragment name ├─────────────────►◄
```

The fragment name:

```
   ┌─A─┐
├──┼───┼──────────────────────────────────┤
   ├─B─┤
   └─C─┘
```

Syntax diagram description	Example
Footnote: A footnote in the diagram references specific details about the syntax that contains the footnote. In this example, the footnote by the arrow references the number of times you can repeat the item.	►►──┬─*repeat*───(1)───┬──────────►◄ └────,────┘ **Notes:** 1 Specify *repeat* as many as 5 times.

New for Tivoli Storage FlashCopy Manager Version 4.1.2

IBM Tivoli Storage FlashCopy Manager for Windows includes several new features and changes.

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

Restoring public folder mailboxes in Microsoft Exchange Server 2013 and later environments

In Exchange Server 2013 or later, you can restore all or part of a public folder mailbox by using the mailbox restore views of Microsoft Management Console (MMC).

You can also use the command-line interface to complete this task. Use the **/MAILBOXFilter** and **/MAILBOXRESTOREDESTination** parameters on the **restoremailbox** command.

Restoring archive mailboxes in Microsoft Exchange Server 2010 and later versions

In Exchange Server 2010 or later, you can restore all or part of an archive mailbox by using the mailbox restore views of MMC.

You can also use the command-line interface to complete this task. Use the **/FROMArchive**, **/MAILBOXFilter**, and **/MAILBOXRESTOREDESTination** parameters on the **restoremailbox** command.

Performance improvement for Exchange Server operations

In this release of Data Protection for Microsoft Exchange Server, performance is improved when users, who are not in the Organization Management group, log on and run Exchange Server operations.

Performance improvement in the Mailbox Restore Browser interface

In this release, Data Protection for Microsoft Exchange Server retrieves mailbox information and displays the RDB mailbox list more quickly in the Mailbox Restore Browser interface.

Verifying MAPI connections by using MMC

In Exchange Server 2013 or later, you can verify that the MAPI connection to an Exchange Server is successful and that a user mailbox is online. You can view and update settings such as the registry key for the Exchange Server and the server domain name.

Chapter 1. Tivoli Storage FlashCopy Manager for Windows overview

With IBM Tivoli Storage FlashCopy Manager, you can back up and restore Microsoft Exchange Server databases and Microsoft SQL Server databases to the Tivoli Storage Manager server or local shadow volumes. A *local shadow volume* contains data that is stored on shadow volumes, which are local to a disk storage subsystem.

You can install, configure, and use Tivoli Storage FlashCopy Manager with different operating systems, databases, and applications or file systems. The software is compatible with most hardware that use FlashCopy technology.

The following table lists Tivoli Storage FlashCopy Manager components that operate in Microsoft Exchange Server, Microsoft SQL Server, and file system and custom application environments:

Table 1. Tivoli Storage FlashCopy Manager components in Windows environment

Component	Description
Microsoft Management Console (MMC) Snap-in and Base System Services	Uses MMC and a generic backup agent to create snapshots of file systems, applications, or databases.
VSS Requestor	Uses the VSS backup-archive client as a VSS interface to communicate with Microsoft VSS services, access data, and create volume shadow copies.
Tivoli Storage FlashCopy Manager for Exchange Server	Uses Microsoft Exchange Server capabilities to complete the following tasks: • Store VSS backup copies locally as persistent snapshots, or store VSS backup copies as snapshots on the Tivoli Storage Manager server. You can also offload backups to Tivoli Storage Manager. • Centralize policy management and scheduling. • Complete VSS, and volume-level instant restore operations. • Complete individual mailbox restore operations.
Tivoli Storage FlashCopy Manager for SQL Server	Uses Microsoft SQL Server capabilities to complete the following tasks: • Complete legacy-style and VSS backups. • Store VSS backup copies locally as persistent snapshots, or store VSS backup copies as snapshots on the Tivoli Storage Manager server. You can also offload backups to Tivoli Storage Manager. • Centralize policy management and scheduling. • Complete VSS, and volume-level instant restores.

You can use Tivoli Storage FlashCopy Manager with Tivoli Storage Manager. When the two products are used together, they provide advanced data protection and centrally managed, policy-based administration capabilities for Tivoli Storage FlashCopy Manager backup images.

Data backup processing

Tivoli Storage FlashCopy Manager can use the Microsoft Volume Shadow Copy Service (VSS) framework to produce a point-in-time, consistent, online copy of Exchange Server, SQL Server, file system, or custom application data.

Database backup types

With Tivoli Storage FlashCopy Manager for Exchange Server and Tivoli Storage FlashCopy Manager for SQL Server, you can use the common interface in the Volume Shadow Copy Service (VSS) framework to create database backups.

You can back up Tivoli Storage FlashCopy Manager for Exchange Server data by using the following methods:

Table 2. Tivoli Storage FlashCopy Manager for Exchange Server VSS backup types

VSS backup types	
Full backup	With this method, Data Protection for Exchange Server backs up the specified database and associated transaction logs.
Copy backup	With this method, Data Protection for Exchange Server does not delete transaction log files after the backup. Otherwise, this type is similar to a full backup. Use a copy backup to create a full backup of the Exchange Server database without disrupting any backup processes that use an incremental or differential backup.
Incremental backup	With this method, Data Protection for Exchange Server backs up only transaction logs. Transaction log files are not deleted if the backup fails. When you restore an Exchange Server database from an incremental backup, you must complete the following tasks: • Restore the last full backup. • Restore any other incremental backups that occur between the full backup and the incremental backup. • Restore the incremental backup.

VSS backup types	
Differential backup	With this method, Data Protection for Exchange Server backs up transaction logs. When you follow a full backup with only differential backups, the last full backup and the last differential backup contain all the data that is required to restore the database to the most recent state. When you restore an Exchange Server database from a differential backup, you must complete the following tasks: • Restore the last full backup. • Restore this differential backup, but no other differential backups.

Attention: When you enable circular logging, you cannot use differential or incremental backups. Data loss might occur if the log wraps before the incremental or differential backup ends.

VSS backups are at the volume and file-level. Legacy backups are a stream of bytes that Data Protection for SQL Server stores on the Tivoli Storage Manager server.

You can back up Tivoli Storage FlashCopy Manager for SQL Server data by using the following methods:

Table 3. Tivoli Storage FlashCopy Manager for SQL Server backup types

Tivoli Storage FlashCopy Manager for SQL Server	
Full database backup (Legacy and VSS)	With this method, Data Protection for SQL Server backs up an SQL Server database and the portion of the transaction log that is necessary to provide a consistent database state. With this backup type, the copy includes enough information from any associated transaction log to create a backup that is consistent with itself. The portion of the log that is included contains only the transactions that occur from the beginning of the backup until its completion.
Copy-only full backup (Legacy and VSS)	With this method, Data Protection for SQL Server creates data backups that do not affect existing backup and restore processes and can be retained in the longer term. For example, you can use this type to back up a log before an online file restore operation. In this example, the copy-only full backup is used once. After the backup is restored, it is deleted.

Table 3. Tivoli Storage FlashCopy Manager for SQL Server backup types (continued)

Tivoli Storage FlashCopy Manager for SQL Server	
Differential backup (only Legacy)	With this method, Data Protection for SQL Server backs up only the data pages in an SQL Server database instance that changed after the last full backup. A portion of the transaction log is also backed up. Differential backup is associated with the last full backup that was run. The last full backup might be completed by Data Protection for SQL Server or another application. For example, if you run a full SQL Server-to-disk backup, and run a differential backup, the differential backup is associated with the SQL Server disk backup. You cannot use differential backup for databases on the secondary replica in Microsoft SQL Server 2012.
Log backup (only Legacy)	With this method, Data Protection for SQL Server backs up only the contents of an SQL Server database transaction log since the last successful log backup. This type of backup is preceded by a full backup or an equivalent type of backup. Log backups normally follow full backups. The portion of the log that is included in full and differential backups is not equivalent to a log backup. Additionally, in full and differential backups, the log is not truncated as it is during a log backup. However, a log backup that follows a full or differential backup includes the same transactions as a full or differential backup. Log backups are not cumulative as are differential; they must be applied against a base backup and in the correct order.
File backup (only Legacy)	With this method, Data Protection for SQL Server backs up only the contents of a specified SQL Server logical file. This type of backup can ease the scheduling conflicts if you must back up large databases. You can back up different sets of files during different scheduled backups. File, group, and set backups must be followed by a log backup, but a full backup is not required.

Tivoli Storage FlashCopy Manager for SQL Server	
Group backup (only Legacy)	With this method, Data Protection for SQL Server backs up only the contents of a specified SQL Server file group. You can back up the set of database tables and indexes within a specific group of files. The group is specified as part of the setup within SQL Server when you define the database files. If no group is specified and all the database files are part of the primary group, you cannot partially back up or partially restore the database by using the group.
Set backup (only Legacy)	With this method, Data Protection for SQL Server backs up the contents of specified SQL Server file groups and files as a unit.

Volume Shadow Copy Service framework

Volume Shadow Copy Service (VSS) provides a common interface model to generate and manage online snapshots of Exchange Server, SQL Server, file system, or custom application data.

The Microsoft VSS service manages and directs three VSS software components that are used during VSS operations: the VSS writer, the VSS Requestor, and the VSS provider. The VSS writer is the application that stores data on the source volumes. The VSS Requestor is the backup software. The VSS provider is the combined hardware and software that generates the snapshot volume.

The VSS system provider creates and maintains snapshots on local shadow volumes and refers to the default VSS provider that is available with Windows Server. If you use the Windows VSS system provider, no configuration is required. However, you can make changes by using the **VSSADMIN** commands.

With a VSS hardware and software copy provider, you can create shadow copies of running volumes on demand. A hardware provider uses a hardware storage adapter or controller to manage shadow copies at the hardware level. Tivoli Storage FlashCopy Manager for Windows software does not control the VSS hardware provider. The VSS hardware provider is controlled by the hardware vendor. Install and configure the VSS hardware and software provider as required.

Data backup methods

With Tivoli Storage FlashCopy Manager, you can use Volume Shadow Copy Service (VSS) to back up Data Protection for SQL Server and Data Protection for Exchange Server data. For SQL Server, you can also run legacy backups that create a copy of all or part of an SQL database or logs on Tivoli Storage Manager storage media.

You can run Exchange Server backup operations in a Database Availability Group (DAG) environment.

VSS data backups

You can store VSS backups on local VSS shadow volumes, or, when integrated with Tivoli Storage Manager, in Tivoli Storage Manager server storage.

VSS backups eliminate the need for the server or file system to be in backup mode for an extended time. The length of time to complete the snapshot is measured in seconds, not hours. In addition, a VSS backup allows a snapshot of large amounts of data at one time because the snapshot works at the volume level.

You must ensure that sufficient space is available for the snapshot at the storage destination. Both storage destinations require space to store the snapshot until the data transfer to the Tivoli Storage Manager server is complete. After the data transfer to the server is complete, VSS backups that are stored locally on VSS shadow volumes are directly accessible by the system. The snapshot volume is released and the space can be reused.

- For data that is backed up to local VSS shadow volumes, the snapshot backup is on the shadow copy volume.
- For data that is backed up only to Tivoli Storage Manager server storage, a local snapshot backup is run and the data on the local snapshot volume is sent to the Tivoli Storage Manager server.
- For data that is backed up to VSS shadow volumes and Tivoli Storage Manager server, the local snapshot volume is retained as a local backup after the transfer to the Tivoli Storage Manager server is complete.

If you store VSS backups both locally and to Tivoli Storage Manager server, and the maximum number of local backup versions to be maintained is reached, the oldest local backup version expires to create the new snapshot for the backup to Tivoli Storage Manager server storage. The maximum number of local backup versions that are maintained is set in the Tivoli Storage Manager policy.

Offloaded VSS backups

By running an offloaded backup, you can move the backup load from the production system to another system. You can reduce the load on network, I/O, and processor resources during backup processing.

Use the `RemoteDSMAGENTNode` parameter to run an offloaded system. Ensure that you install a VSS hardware provider, which supports transportable shadow copy volumes,on the production and secondary systems.

Exchange Database Availability Group backups

You can use the high-availability feature of Database Availability Group (DAG) backups for enhanced data and service availability, and automatic recovery from failures. You can use Exchange Server 2010 and later versions with DAG backups to improve Exchange Server data backups and data recovery.

A DAG environment includes the following functions:

- A group of up to 16 mailbox servers that can host to 100 mailbox databases
- Up to 16 online copies of a database (1 active database and up to 15 passive databases)
- Synchronous or lagged replication. With lagged replication, you can delay the replaying of logs on target databases if, for example, there are time differences between source and target databases.
- Automatic migration and failover of active database copies

The following figure illustrates a DAG environment:
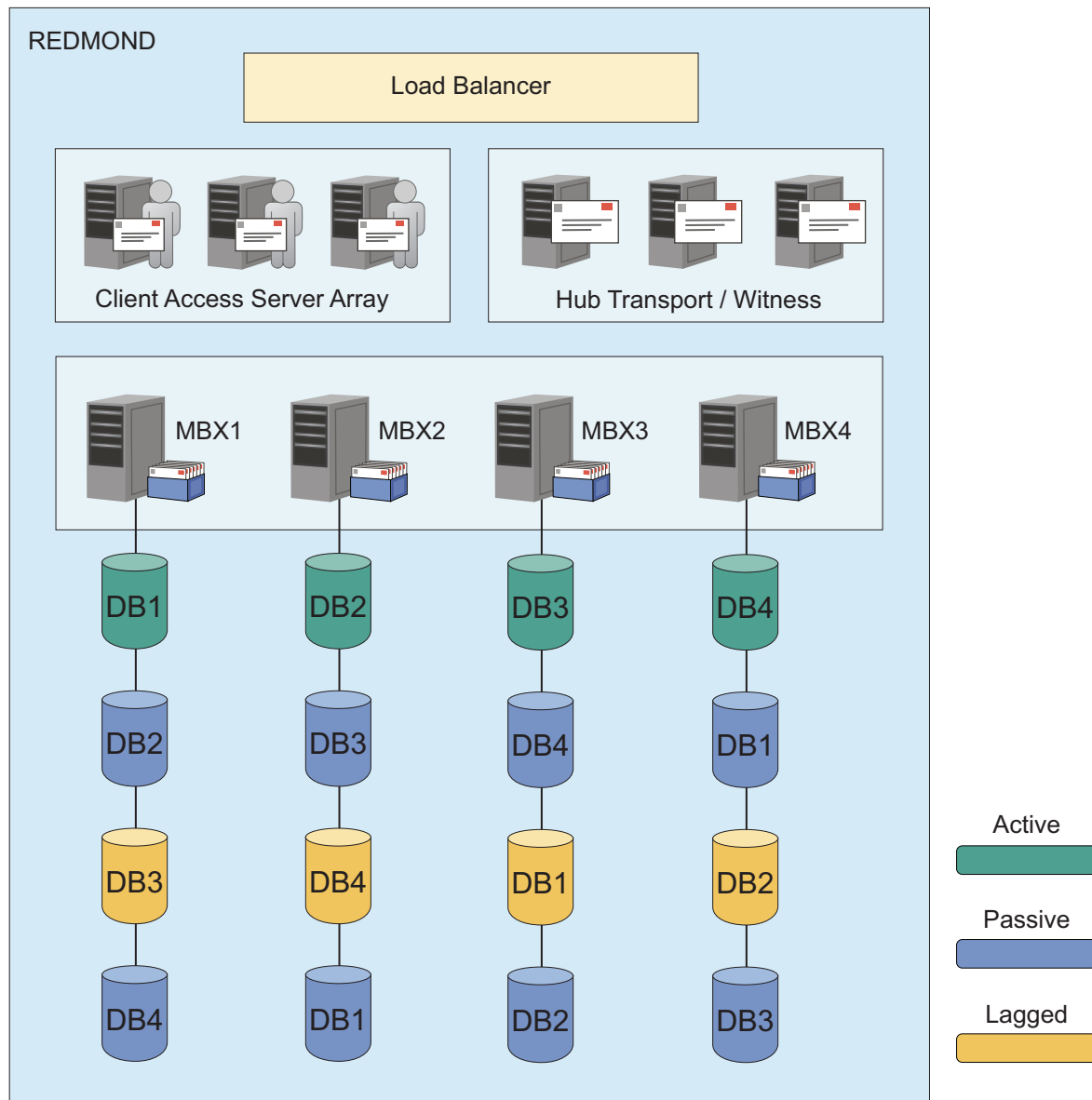
Figure 1. Sample DAG environment

Database copies are mirrored on any node within the DAG. You can complete the following tasks:

- Query DAG database copies, including status.
- Manage full, copy, incremental, and differential backups of active and passive databases within a DAG. You can create a backup from any active database copy, any passive synchronous copy, or any lagged copy within the DAG. If you back up a lagged database copy, it might take more time to restore the backup because the lagged copy can have more transaction logs to restore and replay. As a best practice, create your backup from a passive synchronous copy and not a lagged copy.
- Move an active database copy to other nodes.
- Query all DAG database copy backups.

- Restore all DAG database copy backups.
- Restore data into an active database, from either active or passive database copy backups.
- Restore data into a recovery or alternate database.
- Process Individual Mailbox Restore (IMR) operations from a DAG database copy backup.
- Delete DAG database copy backups.

SQL Server legacy backups

With Tivoli Storage FlashCopy Manager for SQL Server, you can run legacy backups and store the backup on Tivoli Storage Manager server.

Legacy backups are unlike VSS backups because volume and file-level data are not backed up with this method.

Related concepts:

"Thin provisioning" on page 46

Data restore processing

Tivoli Storage FlashCopy Manager can use the Microsoft Volume Shadow Copy Service (VSS) framework to complete fast and instant restores of database backups. You also restore VSS backups to an alternate database and complete Exchange mailbox restore operations. For SQL Server, you can run legacy restore operations from Tivoli Storage Manager server.

In a VSS restore operation, you restore one or more databases from a VSS backup on Tivoli Storage Manager server storage to the original location on the Exchange or SQL Server.

VSS fast restore processing

A VSS fast restore operation restores data from a local snapshot. A VSS fast restore operation overwrites any files that exist at the time of the snapshot on the original source location. The file is overwritten with the version stored on the snapshot. Data is overwritten even if a file is marked read-only.

You can use VSS fast restore operations for the following tasks:
- Restore Exchange Server VSS backups, full, copy, incremental, and differential backup types.
- Restore data at the database level. For custom application and file system data, however, you can only restore data at the file system level. File overwriting occurs even if the file is marked read-only.
- Restore only SQL Server VSS backups to the same SQL Server instance.
- Restore SQL Server VSS backups to an alternate location by using the **/relocatedir** option.
- Restore a VSS backup to an alternate database.
- Restore one or more databases or file systems from a VSS snapshot backup on local shadow volumes that are managed by Tivoli Storage FlashCopy Manager.
- For SQL, custom application, and file system data, restore the data in Microsoft Windows failover clustering environments.
- In a Tivoli Storage Manager configuration, restore local database backups to only the system that created the backup.

VSS instant restore processing

A VSS instant restore operation restores data by using a hardware-assisted restore method. A FlashCopy operation is an example of a hardware-assisted restore method. Instant restore processing is done at the volume level.

Even though Exchange Server data is restored relatively quickly, the transaction logs must be replayed after a restore operation. The time of recovery for the Exchange Server database increases as the number of logs to be replayed increases.

VSS instant restore is typically used to restore local VSS backups of the SAN-attached volumes from IBM System Storage SAN Volume Controller, IBM System Storage DS8000 series, IBM Storwize V7000, or XIV. The VSS instant restore process requires a VSS hardware provider. For Exchange Server data, you cannot use instant restore processing for differential and incremental backups.

The data that is to be restored must be on a storage system that is valid for VSS instant restore operations. If data is not on an XIV, SAN Volume Controller, or Storwize V7000 systems with space-efficient target volumes, you must ensure that background copies that use the volumes are restored.

You can manually disable VSS instant restore processing so that Tivoli Storage FlashCopy Manager uses VSS fast restore. Instant restore processing is automatically disabled for these VSS restore operations:
- Restore data to an alternate location
- Restore data to an Exchange Server recovery database
- Restore files by issuing the `restorefiles` command

Restriction: SQL Server VSS backups can be restored only to the same SQL Server instance from which they are backed up.

When you plan to implement VSS instant restore operations, consider the following guidelines:
- IBM System Storage DS8000 series requires IBM System Storage Support for Microsoft Volume Shadow Copy Service software.
- SAN Volume Controller requires IBM System Storage Support for Microsoft Volume Shadow Copy Service software.
- Storwize V7000 requires IBM System Storage Support for Microsoft Volume Shadow Copy Service software.
- XIV has separate VSS Provider software.
- Backups can be restored only to the same storage subsystem from which they are backed up.

For instant restore operations, use the devices that are listed here: Storage Architecture Support for Tivoli Storage FlashCopy Manager (http://www.ibm.com/support/docview.wss?uid=swg21455924).

VSS backups that are restored to alternate databases

IBM Tivoli Storage FlashCopy Manager can restore an Exchange Server database backup or DAG active or passive database copy backup, to a recovery database or to an alternate (or relocated) database.

This restore method is called *restore into*. If you are restoring a relocated database, use the *restore into* function. You must specify the same database name as the one you are restoring.

Attention: If you use the *restore into* function, VSS instant restore capability is automatically disabled.

Backups to local shadow volumes can be restored only to the system where the backups are created.

Exchange mailbox restore operations

IBM Tivoli Storage FlashCopy Manager can restore Exchange mailbox databases to a recovery database. You can interactively restore a mailbox or items from a mailbox on Exchange Server.

With Microsoft Exchange Server, you can use the item recovery feature of the Exchange Client to recover messages and folders that were deleted. You can also use the Exchange Server deleted-mailbox to recover deleted mailboxes. Use the Mailbox Restore drag-and-drop function in Tivoli Storage FlashCopy Manager for Exchange Server to select mailboxes and mailbox messages to restore.

Automated Tivoli Storage Manager server failover for data recovery

If you use Tivoli Storage FlashCopy Manager with the Tivoli Storage Manager configuration, Tivoli Storage FlashCopy Manager can automatically fail over to a secondary server for data recovery when there is an outage on the Tivoli Storage Manager server.

The Tivoli Storage Manager server that Tivoli Storage FlashCopy Manager connects to for backup services is called the *primary server*. If the primary server is set up for node replication, the client node data on the primary server can be replicated to another Tivoli Storage Manager server, which is the *secondary server*.

Depending on your configuration, you must set up the following nodes for replication on the primary server:
- Tivoli Storage FlashCopy Manager node
- VSS Requestor node
- Tivoli Storage Manager Remote Client Agent (DSMAGENT) node for offloaded backups to the primary server
- DAG node (for backups of databases in an Exchange Server Database Availability Group (DAG))
- AlwaysOn node for backups of availability databases in an AlwaysOn Availability Group (AAG) on SQL Server 2012 and later versions. The AlwaysOn node is a shared nodes that facilitates backups and restores of availability databases from any replica.

During processing, connection information for the secondary server is automatically sent to Tivoli Storage FlashCopy Manager from the primary server. The secondary server information is saved to the client options dsm.opt file.

Each time the backup-archive client logs on to the server for backup services, it attempts to contact the primary server. If the primary server is unavailable, the backup-archive client automatically fails over to the secondary server. In failover mode, you can restore data that is replicated to the secondary server. When the primary server is online again, the backup-archive client automatically fails back to the primary server the next time the backup-archive client connects to the server.

Requirements: To ensure that automated client failover can occur, Tivoli Storage FlashCopy Manager must meet the following requirements:
- Tivoli Storage FlashCopy Manager must be at least at V4.1 level or later.
- The primary server, secondary server, and backup-archive client must be at least at V7.1.1 level or later.
- The primary and secondary servers must be set up for node replication.
- The following nodes must be configured for replication with the `replstate=enabled` option in each node definition on the server:
  - Tivoli Storage FlashCopy Manager node
  - VSS Requestor node
  - Remote DSM agent node for offloaded backups
  - DAG node, if applicable
  - AlwaysOn node, if applicable
- Before the connection information for the secondary server can be sent to Tivoli Storage FlashCopy Manager, the following processes must occur:
  - You must back up data at least one time to the primary server.
  - The following nodes must be replicated at least one time to the secondary server:
    - Tivoli Storage FlashCopy Manager node
    - DAG node, if applicable
    - AlwaysOn node, if applicable

The following restrictions apply to Tivoli Storage FlashCopy Manager during failover:
- Any operation that requires data to be stored on the Tivoli Storage Manager server, such as backup operations, are not available. You can use only data recovery functions, such as restore or query operations.
- Schedules are not replicated to the secondary server. Therefore, schedules are not run while the primary server is unavailable.
- If the primary server stops before or during node replication, the most recent backup data is not successfully replicated to the secondary server. The replication status of the file space is not current.

  Attention: If you restore data in failover mode and the replication status is not current, the recovered data might be corrupted. You must wait until the primary server comes back online before you can restore the data.

Chapter 2. Planning

You can install and configure Tivoli Storage FlashCopy Manager software on a local system or on a virtual machine. From one Tivoli Storage FlashCopy Manager installation, you can manage all of the Tivoli Storage FlashCopy Manager installations in your enterprise.

About this task

Before you implement your backup and restore strategies, review the security requirements and other guidelines that are specific to protecting data in your Tivoli Storage FlashCopy Manager for Windows environment. Consider how to manage your Tivoli Storage Manager policy, and set Tivoli Storage FlashCopy Manager configuration options and preferences.

Storage capacity requirements

With Tivoli Storage FlashCopy Manager, you need storage space for the product installation, space to store Tivoli Storage FlashCopy Manager metadata, and space on the storage device for the snapshot backups.

Product installation

The space that you need for the product installation of Tivoli Storage FlashCopy Manager depends on the components that are installed. Space requirements also depend on required maintenance updates and required operating systems, applications, and other software currency support.

When you plan your product installation, the following components are required depending on the data that you want to protect:

- Microsoft Management Console (MMC) and the VSS Requestor are required components. You install MMC when you install the software by running the `setupfcm.exe` file. The VSS Requestor is automatically installed for all installations.
- For Exchange Server data protection, you need Tivoli Storage FlashCopy Manager backup and restore data.
- For SQL Server data protection, you need Tivoli Storage FlashCopy Manager backup and restore data.

Tivoli Storage FlashCopy Manager metadata

Tivoli Storage FlashCopy Manager uses disk space to store product metadata data that tracks and manages snapshots (point-in-time consistent copies of your application data). The amount of space that is required is directly proportional to the number of snapshots that you maintain on the system. For each snapshot that you plan to retain on the system, ensure that at least 1 MB of free disk space is available to store the metadata.

Configuration with only Tivoli Storage FlashCopy Manager
> If you are protecting an Exchange Server, Tivoli Storage FlashCopy Manager retains mailbox history information in the metadata to support individual mailbox restore (IMR) processing. The amount of space that is

required to store the metadata is proportional to the number of mailboxes and log files in the entire organization. For each user mailbox in your organization, ensure that at least 50 KB of disk space is available to store the metadata.

Configuration with Tivoli Storage Manager and Tivoli Storage FlashCopy Manager

If you are protecting an Exchange Server, Tivoli Storage FlashCopy Manager retains the mailbox history information that is stored on the Tivoli Storage Manager server. In this configuration, no disk space is required for Tivoli Storage FlashCopy Manager.

Snapshot copies

The snapshot copies of your application data require the most storage space. The amount of space that is required depends on the following factors:

- The VSS provider that you use and the configuration of the VSS provider
- The total size of all source volumes that contain the application data
- The rate at which the source volumes are altered after a snapshot is taken

On SAN Volume Controller, DS8000, and Storwize V7000 storage devices, full snapshot copies require the same amount of space as the corresponding source volumes. Full snapshots are the standard type of FlashCopy snapshot. However, with the Windows System VSS provider, space-efficient copies on SAN Volume Controller and the XIV system initially require space for only the metadata. The space requirement for the snapshot copies increases with every volume block that changes on the corresponding source volume. As more source volume blocks change, more space is required for the target volumes that represent a snapshot copy of those applications. For more details, review the documentation that is available for your VSS provider.

Data protection in VSS environments

The characteristics of VSS backup and restore operations can affect your management tasks, for example, the backup types that are supported, the backup granularity, and the backup storage location options. As you decide your backup and restore strategies, be aware of the following VSS guidelines.

Related tasks:

VSS backup characteristics

Backups can be stored on local shadow volumes, Tivoli Storage Manager server, or at both locations. You can define different policy settings for each backup location.

Databases that are to be backed up, queried, restored, or deleted must have unique names. If a database has the same name as another database, but the letter capitalization differs, the software does not differentiate between the letter cases. The software reports an error in this situation.

When you use Tivoli Storage FlashCopy Manager to back up Exchange Server data, consider the following characteristics of VSS backups:

- Backups provide an Exchange Server database integrity check function, but do not provide a zeroing function.
- Full, copy, differential, and incremental backup types are supported.

- For stand-alone and Tivoli Storage Manager configurations, Exchange Server Database Availability Group (DAG) databases can be backed up under a common DAG node name, regardless of which DAG member runs the backup. The backup can be from an active or passive copy. When you back up data to a common node, the backups are managed by a common policy, and you can restore the database backups to any Exchange Server. In a stand-alone configuration, you cannot back up databases from server *1* and restore to server *2*. In this situation, you require a Tivoli Storage Manager configuration.
- Backups to **LOCAL** can be restored only to the same system.

When you use Tivoli Storage FlashCopy Manager to back up SQL data, consider the following characteristics of VSS backups:
- Backups can run in a supported Microsoft Windows Failover Clustering or Veritas Cluster Server (VCS) environment.
- The full and copy-only full backup types are supported. Log, differential, file, group, and set backup types are not supported.
- VSS backups of SQL Server databases in an AlwaysOn Availability Group (AAG) are supported.

For custom application and file system data, backup granularity is at the file system (volume) level. Drives and mount points are supported. In addition, backups can run in a supported MicrosoftWindows Failover Clustering or Veritas Cluster Server (VCS) environment.

Related concepts:

"AlwaysOn Availability Groups" on page 34

VSS backup requirements

Plan your VSS backup strategy to optimize the performance of your backup operations and to avoid potential problems.

Consider the following requirements when you plan for VSS backups:
- Use Custom application and file system data VSS backups only for NTFS and ReFS volumes.

  For file system and custom application data, data is restored at the volume level. When a file system or custom application data is restored, all files from the VSS snapshot backup are restored to their original location.
- Use single hardware LUNs for log and system files.
- Use single hardware LUNs for the database files.
- Use basic disks.
- If you plan to keep VSS snapshot backups only on local shadow volumes, ensure that you understand the implementation and configuration options of your VSS hardware provider.

  For example, if your VSS hardware provider supports a full-copy snapshot versus a copy-on-write (COW) snapshot mechanism, full-copy type implementations have greater disk storage requirements. However, full-copy type implementations do not rely on the original volume to restore the data and are less risky. COW implementations require much less disk storage but rely completely on the original volume to restore the data.
- If you run parallel VSS backups, stagger the start time of the backups by at least ten minutes. This interval ensures that the snapshot operations do not overlap.
- If you run parallel VSS backups, configure the parallel instance backups so that snapshots of the same volumes are not created.

- If you run parallel VSS backups, ensure that parallel backups do not create a snapshot of the same LUN.
- Do not place multiple volumes on the same LUN. Configure a single volume, single partition, and single LUN as one-to-one.
- Do not set the ASNODENAME option in the dsm.opt file when you use Tivoli Storage FlashCopy Manager. Setting ASNODENAME can cause VSS data backups and VSS restore operations to fail.

VSS restore characteristics

In a VSS restore operation, VSS backups (Exchange Server database files and log files, or SQL database files and log files) that are on Tivoli Storage Manager server storage are restored to their original location.

The following characteristics are true of a VSS SQL Server data restore operation:
- You can restore only SQL Server VSS backups to the same SQL Server instance.
- You can restore full and copy-only full backup types. Differential, individual filegroups, individual files, and set backups are not supported by VSS and therefore, cannot be restored.
- VSS restore granularity is at the database level.
- You can restore one or more databases from a VSS snapshot backup that are on Tivoli Storage Manager server storage.
- You can run restore operations in a Microsoft Windows Failover Clustering or Veritas Cluster Server (VCS) environment.
- You can restore a VSS backup (directly from Tivoli Storage Manager server storage) to an alternate location by using the **/relocatedir** option.
- Parallel VSS fast restore or VSS instant restore operations are not supported on Microsoft Windows Server 2008 and later versions.

The following characteristics are true of a VSS Exchange Server data restore operation:
- If you use a hardware provider, the disks that contain Exchange Server data are configured as basic disks.
- You can restore full, copy, incremental, and differential backup types.
- You can restore a VSS backup to an alternate database.
- VSS restore granularity is at the database level.
- You can restore one or more databases from a VSS snapshot backup that are on Tivoli Storage FlashCopy Manager.
- You can restore data in a Database Availability Group (DAG) environment.
- You can restore a VSS backup, directly from Tivoli Storage Manager server storage, to an alternate system.
- You can restore an Exchange Server 2010 and later backup versions from a DAG replica into the production server.
- Parallel VSS fast restore or VSS instant restore operations are not supported on Microsoft Windows Server 2008 and later versions.
- VSS restore operations ignore the recovery database, and are placed directly into the production database, unless the **/intodb** parameter is specified.
- If you specify **/MOUNTDAtabases**=*yes* during a VSS restore operation, the database that is restored is mounted after the restore operation.

VSS restore guidelines

Unless otherwise specified, a *VSS restore* refers to all restore types that use VSS, including VSS restore, VSS fast restore, and VSS instant restore operations. Review the following guidelines before you complete a VSS restore operation.

Note: If you complete VSS snapshot backups with the backup destination parameter set to TSM, *restore* also refers to an image-level restore from the Tivoli Storage Manager server.

VSS instant restore

A VSS instant restore overwrites the entire contents of the source volumes.

However, you can avoid overwriting the source volumes by specifying `InstantRestore` *No* in Microsoft Management Console (MMC). This option bypasses volume-level copy and uses file-level copy instead to restore the files from a VSS backup that is on local shadow volumes. The source volume must not contain other application data.

- When you run a VSS instant restore, the system does not verify that any other data is present on the volume. Therefore, before you run a VSS restore operation that uses the VSS instant restore function, verify that there is no other data on the volumes that are being restored.
  - VSS instant restore requires that the local disk is not being accessed by other applications, for example, Windows Explorer.
  - If you want to avoid overwriting the source volumes, or if you are restoring a single database from a VSS backup that is on local VSS shadow volumes that contain more than one database, ensure that you set the **Instant Restore** option to **No**.
- When you complete a VSS instant restore operation, ensure that any previous background copies that involve the volumes that are being restored, are completed before you initiate the restore operation. However, this check is not necessary for XIV, SAN Volume Controller, or Storwize V7000 with space-efficient target volumes.

VSS fast restore

In a VSS fast restore operation, files are copied from the snapshot to the original volume. This restore operation overwrites all files with the same names without prompting. If you do not want to overwrite all the files on the original volume, mount the snapshot. Copy only the files that you want to restore.

When you complete a VSS restore operation from local shadow volumes, the bytes that transfer are displayed as *0* because no data (*0*) is restored from the Tivoli Storage Manager server.

Because of an SQL Server limitation, you cannot restore a VSS backup to an alternate SQL Server instance. VSS backups are restored to the same SQL Server instance where the snapshot is taken.

Protection of Microsoft Exchange Server data

With Tivoli Storage FlashCopy Manager, you can back up and restore Exchange Server data and protect your Exchange Server environment.

Data Protection for Microsoft Exchange Server supports backup and restore operations in a Database Availability Group (DAG) environment. A DAG consists of mailbox servers that provide recovery from database, server, or network failures. DAGs provide continuous replication and continuous mailbox availability.

Security requirements for Microsoft Exchange Server data

For Tivoli Storage FlashCopy Manager security, users who are logged on to the Exchange Server must have role-based access control (RBAC) permissions to access mailboxes and to complete mailbox restore tasks.

RBAC permissions are typically set with Exchange Powershell cmdlets in a Microsoft Exchange configuration process. For more information, see Understanding Role Based Access Control (http://technet.microsoft.com/en-us/library/dd298183%28v=exchg.150%29.aspx).

If you are authorized by the security policy in your organization, add users in the Exchange Organization Management role group or subgroups. Users in the Exchange Organization Management role group or subgroups have sufficient privileges to optimally complete mailbox restore operations. Users who are not in the Exchange Organization Management role group or subgroups might experience slower performance.

In summary, you must define a minimum set of management roles and role scope for the Exchange user.

- Management roles: "Active Directory Permissions", "Databases", " Disaster Recovery", "Mailbox Import Export", "View-Only Configuration", and "View-Only Recipients".

  To restore an Exchange 2013 public folder mailbox, the Exchange user must also have the `Public Folders` management role. To restore mail to a Unicode PST file, the Exchange user must have the `Mailbox Import Export` management role.

  A typical Exchange Powershell cmdlet that sets RBAC permissions is as follows:

  New-RoleGroup -Name "My Admins" -Roles "Active Directory Permissions", "Databases",

  "Disaster Recovery", "Mailbox Import Export", "Public Folders",

  "View-Only Configuration", "View-Only Recipients" -Members operator1

  The preceding example creates a new group, My Admins, with minimum roles to run Tivoli Storage FlashCopy Manager, and assigns user operator1 to this group. The operator1 user can run Tivoli Storage FlashCopy Manager but with limited Exchange privileges, for example, the user cannot create or remove a user mailbox.

- Management role scope. Ensure that the following Exchange objects are within the management role scope for the user who is logged on to the Exchange Server:
  - The Exchange Server that contains the required data
  - The recovery database that Tivoli Storage FlashCopy Manager creates
  - The database that contains the active mailbox
  - The database that contains the active mailbox of the user who completes the restore operation

- Verify that the Exchange user is a member of a local Administrator group, and has an active Exchange mailbox in the domain.

  By default, Windows adds the Exchange Organization Administrators group to other security groups, including the local Administrators group. For Exchange users who are not members of the Exchange Organization Management group, you must manually add the user account to the local Administrators group by using the Local Users and Groups tool on the computer of the domain member (select **Administrative tools** > **Computer Management** > **Local Users and Groups tool**). On a domain controller computer that does not have a local Administrators group or Local Users and Groups tool, manually add the user account to the Administrators group in the domain (select **Administrative tools** > **Active Directory Users and Computers tool**).

Data backup and restore requirements

To protect Microsoft Exchange Server 2010 and 2013 data, verify that your environment is set up correctly.

Before you run backup and restore tasks, review the following prerequisites:

Microsoft Exchange Server 2010 and 2013 requirements
> Data Protection for Exchange Server requires that you have local Administrator privileges.
>
> Membership in the Organization Management group is not required because you might not want to grant Organization Management group permissions to all Exchange Server backup and restore operators. Instead, you can define customized role-based access control (RBAC) roles and management role scope so that Exchange Server users can run only limited operations within a limited scope.
>
> When you complete data backups, the Exchange Server database file size can increase because of increased database commitments that are triggered by backup operations.

Microsoft Exchange Server 2013 requirements
> For Exchange Server 2013 mailbox restore operations, the MAPI clients must use RPC over HTTPS (also known as Outlook Anywhere). Microsoft does not support RPC over TCP.
>
> Use Exchange Server 2013 CU2 or later versions, and download the correct MAPI. These software requirements are documented in the Hardware and Software Requirements technote at this location: TSM for Mail - All Requirement Documents (http://www.ibm.com/support/docview.wss?uid=swg21219345). Follow the link to the requirements technote for your specific release or update level.
>
> If your environment is configured correctly, mailbox restore operations work in the same way as with previous versions of Microsoft Exchange Server.

Related concepts:

"Security requirements for Microsoft Exchange Server data" on page 18

Microsoft Exchange Server backup strategies

Depending on your Exchange Server environment, you can run full backups only, full plus incremental backups, or full plus differential backups. Your backup strategy might also be to back up data to Tivoli Storage Manager or local shadow volumes.

As you consider your Exchange Server backup strategies, follow these guidelines:

* Do not implement incremental and differential backups together.
* If you choose a strategy that involves incremental or differential backups, you must disable circular logging on the databases of the Exchange Server.
* Consider applying Database Availability Group (DAG) database replication technologies.

   As another DAG backup strategy, consider setting all DAG members to back up all of the database copies. Use the **/MINIMUMBACKUPINTERVAL** and **/PREFERDAGPASSIVE** parameters.

Note: Understand all aspects of Exchange Server disaster recovery and the backup recommendations that Microsoft provides. For more information, see your Exchange Server documentation.

Full backups only

Each backup takes longer to run. However, the restore process is the most efficient because only the most recent (or other appropriate) full backup is restored.

Full backup plus incremental backups

Full backup plus incremental backups is a commonly used strategy when the normal backup schedule or network capacity cannot support a full backup each time.

To minimize the impact on the backup schedule and network traffic during peak times, you can implement a periodic full backup, followed by a series of incremental backups. For example, you can schedule full backups on the weekend and incremental backups during the week. You can implement full backups during low usage times and when increased network traffic can be tolerated. The restore process becomes more complex, however, because a full backup, and subsequent incremental backups, must be restored. In addition, transactions within the logs must be applied which increases processing time. The recovery process takes longer as more transactions are applied.

If you use this backup strategy, modify the Tivoli Storage Manager storage management policies to ensure that all incremental backups are collocated on the Tivoli Storage Manager server. In this way, you can improve data restore performance by reducing the number of media mounts that are necessary to restore a series of incremental backups.

Full backup plus differentials

Data restore operations are more easily implemented with this strategy than with the full plus incremental backup strategy.

This strategy might be useful if your backup schedule and network capacity can facilitate backing up all transaction logs that accumulate between full backups.

This strategy requires that only one differential backup plus the last full backup to be transferred to complete a restore operation. However, the same amount of data must be transferred in the differential image, as in the series of incremental backups.

Therefore, a full backup plus differential backup policy increases network traffic and Tivoli Storage Manager storage usage. This policy assumes that the differential backups are processed as often as the incremental backups.

Carefully consider the potential advantages and whether you can justify the additional resources that are necessary to resend all prior transaction logs with each subsequent differential backup.

Back up to Tivoli Storage Manager storage versus back up to local shadow volumes

When you determine policy for your backups, consider the following differences between backing up data to Tivoli Storage Manager storage versus VSS disks.

A Tivoli Storage Manager backup operation stores the backed up data on Tivoli Storage Manager server storage. Although this type of backup typically takes longer to process than a backup to local shadow volumes, a Tivoli Storage Manager backup is necessary when long-term storage is needed.

Saving Exchange Server or SQL Server data on tape for archival purposes is an example of needing long-term storage. Tivoli Storage Manager backups are also necessary for disaster recovery situations when the disks that are used for local backups are unavailable. By maintaining multiple backup copies on Tivoli Storage Manager server storage, a point-in-time copy is available if backups on the local shadow volumes become corrupted or deleted.

Local shadow volumes

Sufficient local storage space must be available on local shadow volumes for a VSS backup strategy to be successful. To accommodate your backup operations, ensure that enough available storage space is assigned to the volumes.

Environment and storage resources also impact how many backup versions are maintained on local shadow volumes (for VSS fast restore and VSS instant restore) and how many backup versions are maintained on Tivoli Storage Manager server (VSS restore and longer term storage).

Create different sets of policies for backups to both local shadow volumes and to Tivoli Storage Manager server storage. If you use a VSS provider other than the Windows VSS System Provider, make sure to review the documentation for that specific VSS provider.

You can manage backups to local shadow volumes by time and versions. However, because local snapshots are created more frequently, and VSS storage provisioning and space limitations apply, it is more effective to base policy for local backups to be on version limits. In addition, in Database Availability Group (DAG) environments, all of the DAG members must use the same local VSS policy.

Database Availability Group backup and restore operations

To protect data that is stored by Exchange Server Database Availability Groups (DAGs), refer to the following list of requirements.

- When you back up to **LOCAL**, you can complete the restore, delete, and automatic expire operations only on the Exchange Server where the backup is taken.
- You can complete restore operations only on the DAG member with an active database copy.

Sample DAG configuration

DAG members often hold a subset of the Exchange Server databases in a combination of active and passive copies to optimize use of available server resources.

In the following sample configuration, three copies of five databases span five servers in a DAG. This configuration ensures that two servers in the DAG never have the same set of database copies. The configuration also provides greater resilience to failures. Specifically, three servers must fail before the servers lose access to a database.
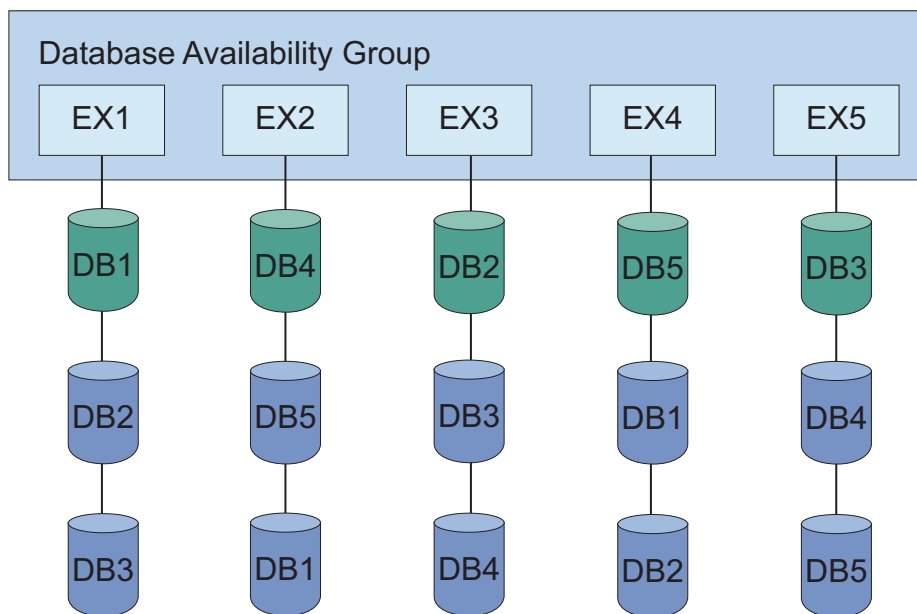
Figure 2. Sample DAG configuration

Backup solutions

You can back up data from any DAG member and restore the data to any DAG member. You can also back up data from either the active or passive copy. Full and incremental database backups do not need to be completed from the same DAG member. All databases included in a VSS type backup are snapped together.

When you back up data, provide options from backup deployment. You want to distribute the backup workload for scalability and isolate backup activity to a dedicated backup node. Isolating backup activity minimizes the impact to production databases.

Ideally, avoid redundant backups of the same databases. Recognizing all replicas as copies of the same database helps achieve this goal. You can also apply retention policies to "unique" databases.

Allowing backups from any node in the availability group and enabling restore operations from any node in the availability group is also ideal.

Achieving these goals

The **DAGNODE** parameter provides a common namespace for all backups. Each node authenticates separately with Tivoli Storage Manager. The backup data is stored in **DAGNODE** namespace by using the `Asnode` option.

To indicate that a backup is taken from a passive copy unless no valid passive copy is available, use the **PREFERDAGPASSIVE** parameter.

If the Exchange Server databases belong to a DAG and are an active database copy, the **EXCLUDEAGACTIVE** parameter excludes the databases from the backup.

If the Exchange Server databases belong to a DAG and are a passive database copy, the **EXCLUDEDAGPASSIVE** parameter excludes the databases from the backup.

To specify the minimum amount of time before a backup of another DAG copy of the same database is allowed, use the **MINIMUMBACKUPINTERVAL** parameter.

The synchronization mechanism between the Data Protection client instances on the same DAG ensures that two nodes do not simultaneously start a backup of the same database.

Sample data protection deployments in DAG environments

The following figure illustrates a deployment of a backup task that is distributed across DAG members.
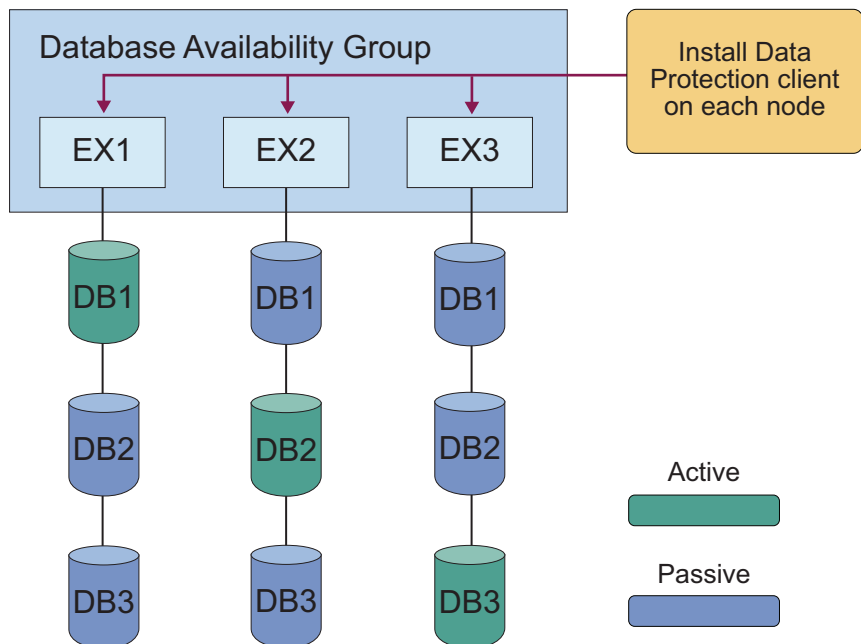
Figure 3. Sample deployment of backup distributed across DAG members

To schedule a CMD type backup on all DAG nodes, the command file contains separate backup commands per database. For example:

```
tdpexcc backup DB1 full /minimumbackupinterval=60 /preferdagpassive
tdpexcc backup DB2 full /minimumbackupinterval=60 /preferdagpassive
tdpexcc backup DB3 full /minimumbackupinterval=60 /preferdagpassive
```

In this deployment, there is one schedule and the same backup command file is used on each node.

The following figure illustrates another possible deployment of a backup that is distributed across DAG members.
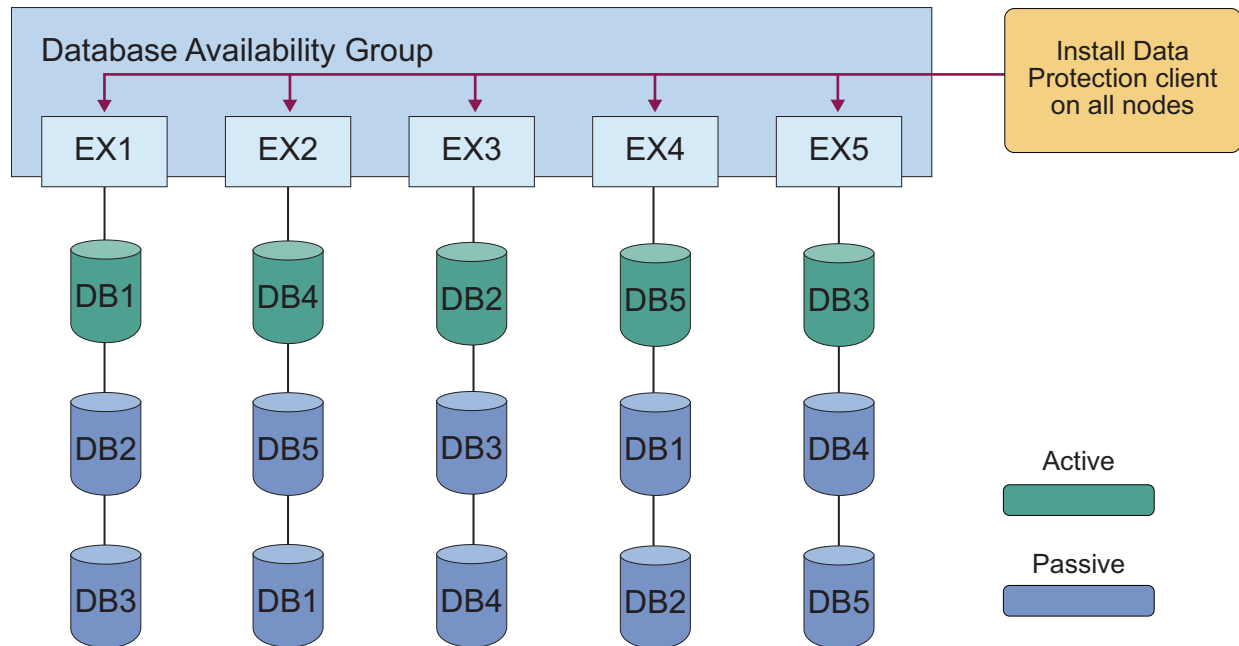
Figure 4. Another sample deployment of backup distributed across DAG members

In this deployment, one schedule and the same backup command file name are used on all nodes. The command file contains separate backup commands per database on that node. For example:

```
tdpexcc backup DB1 full /minimumbackupinterval=60 /preferdagpassive
tdpexcc backup DB2 full /minimumbackupinterval=60 /preferdagpassive
tdpexcc backup DB3 full /minimumbackupinterval=60 /preferdagpassive
```

Again, each line is different per node.

Database Availability Group backup best practices

Complete backups for replicated database copies from the same Exchange Server. Additionally, complete backups on the passive database copies. When you backup passive database copies, you do not increase the load on the production Exchange Server.

Use the following suggestions when you back up databases:

- Perform backups from a passive database copy to avoid increasing the load on the active databases.
- Schedule all DAG members with a copy of the database to back up the database at the same time. In addition, specify the **/MINIMUMBACKUPINTERVAL** parameter. When you specify this parameter, only one backup is taken per backup cycle.
- Optionally, use the /EXCLUDENONDAGDBS command-line backup option to exclude the databases that are not part of the DAG.
- Use the /EXCLUDEDAGPASSIVE, /EXCLUDEDAGACTIVE, or /EXCLUDENONDAGDBS command-line backup options to exclude certain databases from backup processing. You can also use the /MINIMUMBACKUPINTERVAL and /PREFERDAGPASSIVE backup options.
- When there are two or more valid database copies, the integrity check can be skipped by using the /SKIPINTEGRITYCHECK flag.

Best practices for Database Availability Group (DAG) restore operations

Microsoft requires that you run restore databases in (DAG) environments on the active database copy. If you want to restore to a passive database copy, you must first move the copy to the active state. After the restore operation is complete, you can move the active database copy to the passive state.

Sample deployment for exploiting Tivoli Storage FlashCopy Manager for VSS backups

To help you to use Tivoli Storage FlashCopy Manager for VSS backups, see the following illustration of a sample deployment. The ilustration is applicable to Microsoft Exchange Database Availability Groups (DAGs) and Microsoft SQL AlwaysOn Availability Groups (AAGs).

In the illustration, a Database Availability Group is shown, but an AlwaysOn Availability Group (AAG) can also be used.
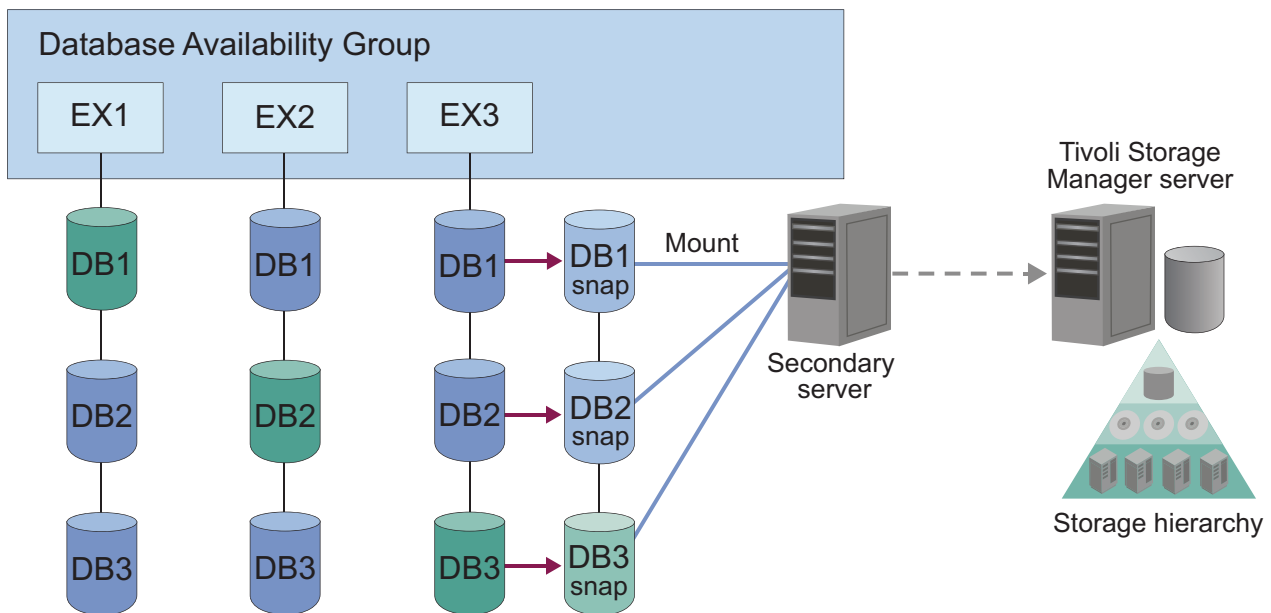
Figure 5. Sample deployment for using Tivoli Storage FlashCopy Manager for VSS backups

In this deployment, you can install a Data Protection client component on one DAG node or AAG replica where the storage snapshot backup is to be completed. You can also define a CMD type schedule to run a CMD file with a backup command similar to the following sample:

```
tdpexccc backup * full /backupmethod=VSS /backupdest=Both /offload
```

For a backup to Tivoli Storage Manager from the VSS snapshot, use a passive copy. You can back up a passive copy (for example, the *DB1* that is attached to *EX3*) so that the primary copy is not impacted. You can also complete an offloaded backup by using the passive copy.

Similarly, as the illustration suggests, you can do both: Back up to Tivoli Storage Manager from the VSS snapshot by using a passive copy, and complete an offloaded backup by using the passive copy.

Mailbox restore guidelines

When you restore mailboxes and mailbox data, you can choose where to restore the mail, and how to restore the mail. You can restore mailbox data from the GUI or command-line interface of Tivoli Storage FlashCopy Manager.

From these interfaces, you have options for restoring data interactively with the Mailbox Restore Browser or directly from Exchange Server database files. When you restore mailboxes and mailbox data on Exchange Server 2010 and later, ensure that your environment is set up to meet the following requirements:

- The administrator account that is used to perform the mailbox restore operation must have an active Exchange mailbox in the domain.
- Temporary space is required to accommodate the mailbox database during data restore operations. Specify the temporary space on the General property page for the Exchange Server workload. On the General property page, set the following options:
  - **Temporary Log Restore Path**
  - **Temporary Database Restore Path**

  Alternatively, set these two optional parameters in the Data Protection for Exchange Server configuration file with the **tdpexcc set** command:
  - **TEMPDBRESTorepath**

    If you choose to not enter a path, the default value of **TEMPDBRESTorepath** is the value of the TEMP environment variable.
  - **TEMPLOGRESTorepath**

    If you choose to not enter a path, the default value of **TEMPLOGRESTorepath** is the value of the TEMP environment variable.

  The temporary restore locations must have enough space to restore the entire restored databases and log files.

  If you do not specify a directory, the database files are restored into a directory that is specified by the TEMP environment variable.
- Ensure that the correct version of Microsoft Exchange Server MAPI Client and Collaboration Data Objects is installed on the Exchange Server that you use to run the mailbox restore operations. The correct version is identified in the Hardware and Software Requirements technote that is associated with the level of your software. This technote is available at this web page:TSM for Mail - All Requirement Documents (http://www.ibm.com/support/docview.wss?uid=swg21219345)

  Follow the link to the requirements technote for your specific release or update level.
- If you plan to restore mail or folders by using a Simple Mail Transfer Protocol (SMTP) Server, make sure to configure the SMTP Server before you attempt a restore operation. Set the configuration in the Management Console by right-clicking **Dashboard** in the tree view and selecting **Properties**. Then, go to the E-mail property page. Enter the SMTP server and port in this property page.
- When you restore mailboxes directly from Exchange Server database files, verify that read and write access to the EDB file is available, and verify that the Exchange Server transaction log files are available.

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

Related concepts:

Protection of Microsoft SQL Server data

With Tivoli Storage FlashCopy Manager, you can back up and restore SQL Server data and protect your SQL Server environment.

Security requirements for Microsoft SQL Server data

Tivoli Storage FlashCopy Manager for SQL Server requires certain settings to process backup and restore operations in a secure environment.

To install Tivoli Storage FlashCopy Manager for SQL Server, Windows administrator authority is required. Tivoli Storage FlashCopy Manager for SQL Server must be registered to the Tivoli Storage Manager server and the appropriate node name and password must be used when it connects to the Tivoli Storage Manager server.

In addition, standard Tivoli Storage Manager security requirements apply to Tivoli Storage FlashCopy Manager for SQL Server.

You have three options when you specify SQL Server logon information:
- Accept the default sa account and system administrator password. Ensure that you secure your sa login account with a non-NULL password.
- Use SQL user ID security and specify both the SQL user name and password. With SQL user ID security, the SQL Server administrator provides the logon ID and the password that provides access to the SQL Server.
- Use a trusted connection and allow Windows authenticate the logon.

The SQL logon user or Windows user name must be added to the SQL Server SYSADMIN fixed server role before Tivoli Storage FlashCopy Manager for SQL Server can use those credentials.

Microsoft SQL Server backup strategies

Depending on your SQL Server environment, you can run full backups only, copy-only full backups, full plus log backups, full plus differential backups, or file and group backups. Your backup strategy might also be to back up data to Tivoli Storage Manager or local shadow volumes.

Full backups only (Legacy and VSS)

A full backup strategy is best for SQL Servers that are relatively small because the entire database is backed up each time.

This strategy is the appropriate strategy for system databases such as *master*, *model*, and *msdb* because of their typical small size. Each backup takes longer to run. However, the restore process is the most efficient because only the most recent (or other appropriate) full backup is restored.

Copy-only full backups (Legacy and VSS)

A copy-only full backup contains a copy-only version of a full backup. Such backups are separate to the regular sequence of conventional SQL Server backups.

Copy-only full backups do not affect the transaction logs or the sequence of backups, such as differential backups or full backups. You might use this strategy

to periodically create copy-only full backups for long-term retention without affecting existing backup schedules or retention policies for disaster recovery.

Full backups plus log (Legacy and VSS)

Full backup plus log backups is a commonly used strategy when the normal backup schedule or network capacity cannot support a full backup each time.

To minimize the impact on the backup schedule and network traffic during peak usage times, you can implement a periodic full backup followed by a series of log backups. For example, you can schedule full backups on the weekend and log backups during the week. You can implement full backups during low usage times and when increased network traffic can be tolerated. You can complete a point-in-time restore operation to restore a transaction log to a specified date and time.

The restore process becomes more complex, however, because a full backup, and subsequent log backups, must be restored. In addition, transactions within the logs must be applied which increases processing time. The recovery process takes longer as more transactions are applied.

You can apply legacy log backups after a full VSS backup is restored. You must leave the database in a recovering state by specifying **/recovery**=no on the command-line interface. Alternatively, ensure that the **Recovery** option in the GUI Restore Databases or Restore Groups/Files is not selected when you restore the VSS backup.

Full backup plus differential backup (Legacy and VSS)

A full plug differential backup strategy can be used between full backups. A differential database backup is cumulative and can save both time and space.

Space is saved because the backup consists of only the changed portions of a database since the last full backup. Time is saved because you can avoid applying all individual log backups to the operation within that time. The space and time saving applies to restore operations as well; only the last differential backup of the latest version must be restored.

Although VSS supports full backups only, you can apply legacy differential backups to the VSS full backup. You must leave the database in a recovering state by specifying **/recovery**=no on the command-line interface. Alternatively, ensure that the **Recovery** option in the GUI Restore Databases or Restore Groups/Files is not selected when you restore the VSS backup.

Full backup plus differential backup plus log backup (Legacy and VSS)

A full plus differential plus log backup strategy reduces the number of transactions that must be restored and applied. Restore operations are faster as a result.

If, for example, you complete a full legacy or VSS backup weekly, and a differential backup nightly, and a log backup every four hours, the restore processing would include the full backup, a differential backup, and at most five log backups. However, if you only complete a full plus log backup scheme on the same cycle, the restore processing would include a full plus up to 41 log backups (six days multiplied by six log backups per day plus up to five backups on the day

the full backup is completed). Although VSS supports full backups only, legacy log backups and legacy differential backups can be applied to the VSS full backup

File or group backups (Legacy only)

Use a file backup strategy when it is impractical to back up an entire database because of size and associated time and performance issues.

When a group is created on the SQL Server, database files are identified with that group. The group that is used for the group backup depends on the group to which the database files are defined.

File or group options can save backup and restore processing time when certain tables or indexes have more updates than others and must be backed up more often. It is time-effective to contain such data in their own filegroup or files and to back up only those items.

The PRIMARY filegroup must be restored before a user-defined filegroup is restored. To ensure that you are able to restore the PRIMARY filegroup backup, create a full backup or a group backup of the PRIMARY filegroup before you create the user-defined backup. Consult your Microsoft SQL Server documentation for more details on SQL Server backup strategy and planning.

Except for logical log files, you can back up your transaction logs after you back up a data file or file group.

Backups to Tivoli Storage Manager storage versus backups to local shadow volumes

When you determine policy for your backups, consider the following differences between backing up data to Tivoli Storage Manager storage versus VSS disks.

A Tivoli Storage Manager backup operation stores the backed up data on Tivoli Storage Manager server storage. Although this type of backup typically takes longer to process than a backup to local shadow volumes, a Tivoli Storage Manager backup is necessary when long-term storage is needed.

Saving Exchange Server or SQL Server data on tape for archival purposes is an example of needing long-term storage. Tivoli Storage Manager backups are also necessary for disaster recovery situations when the disks that are used for local backups are unavailable. By maintaining multiple backup copies on Tivoli Storage Manager server storage, a point-in-time copy is available if backups on the local shadow volumes become corrupted or deleted.

Backups to Tivoli Storage Manager server storage are dictated by time, not by versions.

Local shadow volumes

Sufficient local storage space must be available on local shadow volumes for a VSS backup strategy to be successful. To accommodate your backup operations, ensure that enough available storage space is assigned to the volumes.

Environment and storage resources also impact how many backup versions are maintained on local shadow volumes (for VSS fast restore and VSS instant restore) and how many backup versions are maintained on Tivoli Storage Manager server (VSS restore and longer term storage).

Create different sets of policies for backups to both local shadow volumes and to Tivoli Storage Manager server storage. If you use a VSS provider other than the Windows VSS System Provider, make sure to review the documentation for that specific VSS provider.

You can manage backups to local shadow volumes by time and versions. However, because local snapshots are created more frequently, and VSS storage provisioning and space limitations apply, it is more effective to base policy for local backups to be on version limits. In addition, in Database Availability Group (DAG) environments, all of the DAG members must use the same local VSS policy.

Attention: For legacy database backups, you can verify whether a backup is valid without physically restoring the backup. Before you restore the legacy database backup, you can run the restore operation with the **Verify Only** option in Microsoft Management Console (MMC). Alternatively, you can use the `/VERIFYOnly` option with the `restore` command on the command-line interface.

Backup strategies defined by other considerations

Commonly used backup strategies are as follows:

Clustering
> If you use Microsoft Failover Clustering or Veritas Cluster Server clustering for failover support, you must install Tivoli Storage FlashCopy Manager for SQL Server on each cluster node and configure each node identically. More configuration is required to complete the failover installation. You must identify a clustered SQL Server by its virtual server name and specify that name in Tivoli Storage FlashCopy Manager for SQL Server to access that SQL Server.

Multiple SQL Servers
> If multiple instances of SQL Server are running, the additional server instances are identified by name. You must specify that name in Tivoli Storage FlashCopy Manager for SQL Server to access that SQL Server.

Other strategies
> - Running many full backups can cause the SQL database log to become full. Subsequent backups fail as a result. If necessary, use basic SQL Server tools to truncate the log of your SQL databases.
> - Running legacy log backups to a Tivoli Storage Manager server also truncates the SQL database log files.
> - You cannot restore VSS backups to an alternate SQL Server. This condition is a Microsoft SQL Server limitation.
> - You cannot back up the **tempdb** database because it is a temporary database that is created each time the SQL Server starts.
> - Regardless of the frequency of your database backups, run `dbcc checkdb` and `dbcc checkcatalog` on a database, before you back it up, to verify the logical and physical consistency of the database.

Restore operations for the master database

For Microsoft SQL Server data protection, one of the most important tasks that you must complete is the routine full database restore of the master database. You can schedule to routinely restore the master database.

You must complete a VSS restore of the master database (msdb) offline. Therefore, you must stop the associated SQL Server instance before you run the restore operation. An attempt to restore an online master database fails, and can also disable subsequent VSS backup and VSS restore operations until the SQL Server VSS Writer service is restarted.

If the master database is damaged while a server instance is running, you must fix the damaged database by restoring a recent full master database backup. If a server instance cannot start because the master database is damaged, the master database must be rebuilt.

When you rebuild a master database, all system databases revert to their original state.

Related tasks:

"Restoring the master database" on page 189

Preparing for VSS instant restore operations

With VSS instant restore capability, you can restore one or more databases from a VSS snapshot backup on local shadow volumes that are managed by Tivoli Storage FlashCopy Manager. Restore granularity is at the volume level.

About this task

In a VSS instant restore operation, you can restore full and copy backup types. For SQL, custom application, and file system data, you can run VSS instant restore operations in a Microsoft Failover Clustering environment. Parallel VSS restore operations are not supported on Microsoft Windows Server.

Procedure

1. Verify that you satisfy the VSS requirement for either an IBM XIV VSS Hardware Provider, or System Storage Support for Microsoft Volume Shadow Copy Service software.
2. Verify that the database backups are on the same IBM Systems Storage SAN Volume Controller, DS8000, the XIV system, and IBM Storwize V7000 storage subsystem to which they are restored.
3. Verify that databases are restored to the same drive letter and paths that are used during the original backup.
4. Close applications or windows that might have files or handles open on the volumes that are being restored.

Deployment of Tivoli Storage FlashCopy Manager for SQL Server in a Windows Failover Cluster environment

You can use Tivoli Storage FlashCopy Manager to protect SQL Server 2012 and later versions in a Windows failover cluster environment.

References to the SQL Server pertain to the virtual SQL Server name in a Windows failover cluster environment.

Follow these cluster setup guidelines:
- A Windows Failover Cluster environment is required for AlwaysOn Availability Groups.
- A SQL Server instance must be installed on a node in a Windows failover cluster environment. The cluster node must be online.
- Each availability replica of an availability group must be on a different node in the same Windows failover cluster environment.

Follow these guidelines:
- Install Tivoli Storage FlashCopy Manager on all nodes from where you intend to run backup and restore operations.
- When you use shared disk clusters, install Tivoli Storage FlashCopy Manager on all nodes on a disk that is local to each node and not on a shared cluster disk.
- Use the configuration wizard to register an AlwaysOn Node on the Tivoli Storage Manager server. The AlwaysOn Node manages backups of availability databases. This node is a shared node that allows data backups and restores of availability databases from any replica.
- Databases that are not in an availability group are backed up under the standard Tivoli Storage FlashCopy Manager node name. To migrate your database backups to the AlwaysOn node, an option is available for you to back up all databases to the AlwaysOn node.
- Use identical configurations in the Tivoli Storage FlashCopy Manager options file when you configure Tivoli Storage FlashCopy Manager on each node of the cluster.
- If you use the Tivoli Storage Manager scheduler to automate data backups, install the scheduler service on each node of the cluster to enable failover support.

Follow these operational guidelines:
- The Tivoli Storage Manager server treats backups as originating on a single SQL Server (the virtual server) regardless of which node of the cluster is backed up.
- When you complete a VSS full backup on a secondary replica, the copy-only type of backup is used to take the snapshot.
- Legacy full backups of availability databases on secondary replicas are copy-only. The copy-only option is not automatically used with log backups because log backups that truncate logs are supported on secondary replicas.
- Because of a limitation with the SQL Server, you cannot restore a VSS backup to an alternate instance. VSS backups must be restored on the same SQL Server instance where the snapshot is taken.

AlwaysOn Availability Groups

AlwaysOn Availability Groups (AAG) provide high availability and disaster recovery capabilities.

The AAG provides high availability and disaster recovery at the SQL database level. SQL AlwaysOn Failover Clusters Instance provide high availability and disaster recovery at the SQL Server level. AAGs and SQL AlwaysOn Failover Clusters Instances can be used together. When you work in a AAG environment, consider the following features:

- A group of single or clustered server instances, each holding a copy of all databases, can be in the AAG.
- There can be as many as nine online copies of a database (one primary and up to eight secondary copies).
- Synchronous and asynchronous replication is supported.
- Log shipping is supported.
- Automatic and manual failover modes are supported.
- Databases within an AAG fail over as a group.

Backups of availability databases:

Tivoli Storage FlashCopy Manager backs up and restores each availability database as a single object, regardless of which availability replica is used for backup and restore operations.

An AlwaysOn Availability Group can contain a set of primary databases and multiple copies of the set of primary databases, called secondary databases. Databases in an availability group are called availability databases, and they fail over together as a group.

An AlwaysOn Availability Group requires SQL Server instances on Windows Failover Cluster nodes. An availability group can have a number of replicas. For example, availability group *1* might have replicas *node1*, *node2*, and *node3*.

A cluster node might be an availability replica for one or more availability groups. For example, *node1* might be a replica for availability group *1* and another availability group. For the secondary replica, *read-only* is an option that can be set at the availability group level.

The AlwaysOn Node is used to manage backups of availability databases. When you work in a Tivoli Storage Manager environment, the AlwaysOn Node is to be common in a Windows Failover Cluster. This presence enables the management of backups of an availability database in a single location, regardless of the replica that is used to complete the backup.

The following types of VSS backup operations are supported:
- Full VSS backups of the primary availability replica
- VSS copy-only full backups of availability replicas

Restriction: Microsoft does not support legacy full backups on secondary replicas. , however, does allow a `full` backup of a secondary replica to be completed based on Tivoli Storage Manager policy.

When you initiate a `full` legacy backup of a secondary replica, the underlying implementation of is to back up the data as `copyfull`. However, detects the

intended full backup operation and applies the Tivoli Storage Manager policy that
is associated with the full backup type. Microsoft Management Console (MMC)
and CLI views honor the Tivoli Storage Manager policy that applies to the backup
type and in this instance, show the backup type as full. For more information, see
Active Secondaries: Backup on Secondary Replicas (AlwaysOn Availability
Groups)(https://msdn.microsoft.com/en-us/library/hh245119.aspx).

For all backup operations of secondary availability replicas, the secondary replicas
must be in the synchronized or synchronizing state.

To assist with scheduling and load balancing, scheduled backup preference settings
of availability groups are also available.

Restores of availability databases:

Depending on how you back up availability databases, legacy restore and VSS
restore operations are available to restore the availability databases on primary or
secondary availability replicas.

Certain restrictions apply to the restoring of availability databases:

Legacy restore
> You can restore an availability database on either a primary or secondary
> replica.
>
> During the restore process, the restored database is removed from the
> availability group. When a database is removed from the availability
> group, the database becomes a local database on that replica. The database
> is restored as a local database. After the database is completely restored,
> verify that the data on all replicas is transactionally consistent.
>
> To verify that the data is transactionally consistent, verify that the backup
> copy contains data and transaction log records. Full backups and
> differential backups contain data and transaction log records so that the
> restored database is transactionally consistent.
>
> After you verify that the data is transactionally consistent, manually add
> the database to the availability group.

VSS restore
> Because of an SQL Server limitation, you cannot restore a VSS backup to
> an alternative SQL Server instance. Therefore, VSS backups must be
> restored to the same SQL Server instance where the snapshot is taken.

Enhanced data protection for Microsoft SQL AlwaysOn Availability Groups:

All VSS (full) and legacy (full, differential, file/set/group, and log) backup
operations are supported on the primary replica. Copy-only VSS and legacy
backup operations, and normal log backups are supported on a secondary replica.
No differential backup on a secondary replica is supported.

For backups on a secondary replica, the replica must be in the synchronized or
synchronizing state. You can have multiple AlwaysOn Availability Groups (AAGs)
in a SQL Server cluster. You can also have a mix of standard databases and AAGs
on a SQL Server cluster. All databases included in a VSS-type backup are snapped
together.

When you are backing up data, provide options from backup deployment. You want to distribute the backup workload for scalability and isolate backup activity to a dedicated backup node. Isolating backup activity minimizes the impact to production databases.

If possible, avoid redundant backups of the same databases. Recognizing all replicas as copies of the same database helps achieve this goal. You can also apply retention policies to "unique" databases.

Ideally, you can allow backups from any node in the availability group and enable restores from any node in the availability group.

Achieving these goals with the Tivoli Storage FlashCopy Manager for SQL Server component

When you are using Tivoli Storage FlashCopy Manager for SQL Server to manage AAG backups, use the following SQL Server constructs:
- Backup priority: Specified per database in an AAG. Defines the priority order in which replicas are used to back up a database in an AAG.
- Preferred replica: Specified at an AAG level whether primary or secondary replicas can be used for backup.
  - Prefer secondary replica: Scheduled backups occur on a secondary replica, if available. If the secondary replica is not available, the primary replica can be used.
  - Secondary only: Scheduled backups can occur only on a secondary replica.
  - Primary: Scheduled backups can occur only on the primary replica.
  - Any replica: Scheduled backups can occur on any replica.

You can also use the following Tivoli Storage FlashCopy Manager for SQL Server constructs:
- The **ALWAYSONNODE** parameter provides a common namespace for all backups. Each node authenticates separately with Tivoli Storage Manager. Backed up data is stored in the AlwaysOnNode namespace (by using the Asnode option).
- The **/ALWAYSONPriority** parameter specifies that a local availability database is backed up only if it has the highest backup priority among the availability replicas that are working properly. This parameter applies only to scheduled backups.

Sample data protection deployments in AAG environments

There are two approaches to backing up data:
- A legacy backup is distributed across AAG replicas.
- A VSS backup is distributed across AAG replicas.

Approach® 1: Legacy backup is distributed across AAG replicas
> When a legacy backup is distributed across AAG replicas, use the following list when you are configuring the environment:
> - Set the preferred replica to *prefer secondary replica*.
> - Install Tivoli Storage FlashCopy Manager for SQL Server on all replicas that are eligible to run a backup.
> - Define a CMD type schedule to run a CMD file with a backup command similar to the following sample:
>   ```
>   tdpsqlc backup db1,db2,db3 full /alwaysonpriority
>   ```

- Associate each Tivoli Storage FlashCopy Manager for SQL Server node with the defined schedule.
- Run backups on the SQL node according to defined priorities for each database.

Approach 2: VSS backup is distributed across AAG replicas

When a VSS backup is distributed across AAG replicas, use the following list when you are configuring the environment:

- Set the preferred replica to *prefer secondary replica*.
- Install Tivoli Storage FlashCopy Manager for SQL Server on all replicas eligible to run a backup.
- Define a CMD type schedule to run a CMD file with a separate backup command per database similar to the following sample:

```
tdpsqlc backup db1 full /alwaysonpriority /backupmethod=VSS
 backupdest=TSM
tdpsqlc backup db2 full /alwaysonpriority /backupmethod=VSS
 backupdest=TSM
tdpsqlc backup db3 full /alwaysonpriority /backupmethod=VSS
 backupdest=TSM
```

- Associate each Tivoli Storage FlashCopy Manager for SQL Server node with the defined schedule.
- Run backups on the SQL node according to defined priorities for each database.

Deployment of Tivoli Storage FlashCopy Manager for SQL Server on Windows Server Core

If you are protecting Microsoft SQL Server 2012 and later versions, you can install and use Tivoli Storage FlashCopy Manager on Windows Server 2008 R2 Server Core SP1 and later versions.

Server Core is a minimal and low-maintenance server environment where you can run the minimum services that are necessary to maintain Windows Server 2008 and later versions. You can install and operate Tivoli Storage FlashCopy Manager in this minimal server environment.

In such a minimal environment, only the command-line interface is available for Tivoli Storage FlashCopy Manager on Windows Server Core unless you use the Tivoli Storage FlashCopy Manager remote management support. Additionally, if you use Windows Installer (MSI) to install Tivoli Storage FlashCopy Manager, only the unattended mode is supported.

Protection of custom application and file system data

With Tivoli Storage FlashCopy Manager, you can back up and restore custom application and file system data and protect your environment.

When you use Tivoli Storage FlashCopy Manager software that is configured with a Tivoli Storage Manager server, and you create VSS snapshot backups of application and file system data, you can send the data to the Tivoli Storage Manager server storage pools. The data is set as a FULL image backup. The backup that is stored on the Tivoli Storage Manager server is used to restore volumes and mount points.

When a Tivoli Storage FlashCopy Manager local backup operation begins, the first step is a reconciliation process in which the copies of the snapshot that are valid for expiration, and local snapshots that are deleted, are reconciled.

From the Tivoli Storage Manager server database, the value of the VSS data container VSSDC_*xx* is identified. The mapping to target storage volume is identified in the adsm.sys folder. The default location for this folder is the installation path that is used by the Tivoli Storage Manager backup-archive client.

After a successful reconciliation, the metadata that is stored on the Tivoli Storage Manager server is deleted, the target storage volume is reused for the new snapshot, and the TargetSetsState file is updated with the current mapping.

In the *x:*\adsm.sys\vss_staging directory, the LSM_REP_LOG_VOL_SNAP and .TsmFmDatabases subfolders are vital to operations correctly completing and Tivoli Storage FlashCopy Manager has no mechanism to rebuild them. Do not manually delete these folders.

Regularly back up these folders. If the folders become damaged and unusable, restore the last copy. When the TargetSetsState has a mapping entry, the reconciliation process can detect the inconsistency between TargetSetsState and metadata that is stored on the Tivoli Storage Manager server, and synchronize. For example, if there is an orphan VSSDC_*xx* value in the Tivoli Storage Manager server and the value does not exist in TargetSetsState, reconciliation deletes the orphan metadata from the Tivoli Storage Manager server.

When you restore a VSS backup from a Tivoli Storage Manager server, if the **INSTANTRESTORE** is set to FALSE or **FASTRESTORE** parameter is set to NO, the setting is ignored. (From the command-line interface, the **INSTANTRESTORE** parameter is set to NO, not FALSE.) The restore operation completes with an image-level restore.

When you submit a restore or mount request, all of the volumes that are contained in the original snapshot set are imported. If the number of volumes that are imported exceeds the maximum number of allowable mapped volumes for the environment, the restore or mount operation can fail.

Scripts for automated processing

You can run scripts to prepare and resume custom application and file systems before and after snapshot creation.

To prepare custom application and file systems for volume-level snapshots, you can use preprocessing (**PRESNAPSHOTCMD**) and postprocessing (**POSTSNAPSHOTCMD**) scripts. If specified, these scripts run during backup processing. For example, you can use the **PRESNAPSHOTCMD** script to quiesce an application and the **POSTSNAPSHOTCMD** to resume it.

Data protection in an environment with Tivoli Storage Manager server

Tivoli Storage FlashCopy Manager functions can vary depending on the custom application and file system data that is installed in your environment.

Tivoli Storage FlashCopy Manager provides VSS Backup capability for data that is on Windows file systems. This capability means that you can manage persistent snapshots of the volumes on your system. In addition, Tivoli Storage Manager integration for custom application and file system support provides the following capabilities.

- VSS snapshots of file systems can complete when the backup destination set to TSM and BOTH. (The BOTH option includes TSM and LOCAL.) For backups with backup destination TSM or BOTH, a VSS snapshot is created of the drive letter or mount point that is selected. The backup is sent to the Tivoli Storage Manager server as an image-level backup of the VSS snapshot.
- Offloaded backups with backup destination TSM or BOTH from a secondary system to Tivoli Storage Manager server storage pools.
- Enhanced final backup summary statistics from the command-line interface and Microsoft Management Console (MMC) with information about client-side deduplication, compression, encryption, and other options.
- Enhanced query output from the command-line interface and MMC graphical user interface with information about client-side deduplication, compression, and encryption usage.
- Unified view of available file system backup version on both a local snapshot and when data is stored on a Tivoli Storage Manager server.
- Restore backups that are sent to Tivoli Storage Manager server pools at a file system, drive level. The restore is an image restore.
- Restore backups that are sent to Tivoli Storage Manager server to an alternate location, different local drive letter, or mount point, and restore to an alternate server.

The VSS backups are managed as backup versions by Tivoli Storage FlashCopy Manager management policies. VSS backups remain available for VSS Instant Restore or VSS Fast Restore operations. When Tivoli Storage Manager server is available in the environment, optionally use the Tivoli Storage Manager backup-archive client to create file-level backups of your file system or custom application data in the Tivoli Storage Manager storage pools.

To import VSS snapshots only when needed, verify that the VSS provider supports transportable snapshots. To use the command-line interface for the mount command with remote options, verify that the VSS provider supports transportable snapshots and configure Windows PowerShell Remoting.

Specifying configuration parameters for Tivoli Storage Manager

After Tivoli Storage FlashCopy Manager for Windows is registered to Tivoli Storage Manager, you must configure several parameters.

Before you begin

- The Tivoli Storage Manager administrator must provide you with the node name, password, the communications method, and the appropriate parameters

to connect to the Tivoli Storage Manager server. Parameter values are stored in an options file that is located, by default, in the Tivoli Storage FlashCopy Manager installation directory.

- When you manually set configuration parameters for Tivoli Storage Manager, ensure that the Tivoli Storage FlashCopy Manager options file (`dsm.opt`) and the backup-archive client options file (also `dsm.opt`) specify the same Tivoli Storage Manager server.

About this task

You can use the configuration wizard to guide you in setting the configuration parameters, and start a backup and restore of the data after you complete the wizard. If you do not want to use the configuration wizard to set parameters, you can manually configure the software as follows.

Procedure

1. Edit the options file, the `dsm.opt` file, by using a text editor. If you are running Tivoli Storage FlashCopy Manager on a Microsoft Windows Failover Clustering or Veritas Cluster Server, ensure that the options files on each cluster node are identical.

   The `dsm.opt`options file includes the following parameters, which are necessary for initial configuration:

   COMMMethod
   > This option specifies the communication protocol to use between the Tivoli Storage FlashCopy Manager node and the Tivoli Storage Manager server. Tivoli Storage FlashCopy Manager supports the same set of communication protocols that are supported by other Tivoli Storage Manager clients on Windows systems. Depending on the `commmethod` option that you choose, the connectivity parameters for that **commmethod** must also be specified.
   >
   > - For VSS backups, specify the **COMMMethod** option in the Tivoli Storage FlashCopy Manager options file.
   > - For VSS backups, specify the **COMMMethod** option in the backup-archive client options file that is used as the Local DSMAGENT Node. If the environment is configured for VSS offloaded backups, you must also specify the **COMMMethod** option in the backup-archive client options file that is used as the Remote DSMAGENT Node.

   NODename
   > The Tivoli Storage Manager node name is the unique name by which Tivoli Storage Manager identifies the system that runs Tivoli Storage FlashCopy Manager.

   PASSWORDAccess
   > When you use this option, you can apply two settings: *generate* and *prompt*. The default value is *generate*. After you complete the configuration wizard, you can edit the `dsm.opt` to change the setting to *prompt*.

2. Although the following options are not necessary for initial configuration, and are not specified by default, you can modify the default values if necessary:

   CLUSTERnode
   > When you use this option, you can apply two settings: *yes* and *no*. To run the software in a cluster-aware mode, in the DSMAGENT options

files, the **CLUSTERnode** option must be set to *no*. This *no* setting must be present even in a clustered environment. For the Tivoli Storage FlashCopy Manager options file, this option can be set to *yes*. For more information about configuring in clustered environments, see "Configuring Tivoli Storage FlashCopy Manager for SQL Server clustered environments" on page 88.

HTTPport
> After you complete the configuration, edit the dsm.opt file to specify the HTTP port. The default value is *1581.*

TCPPort
> When you complete the configuration wizard, the value that you enter for TCP port is used for this setting

TCPServeraddress
> When you complete the configuration wizard, the value that you enter for the TCP server address is used for this setting.

3. Optionally, and only for VSS backups that are sent to the Tivoli Storage Manager server, use the following options to turn on features for the data that is sent to the Tivoli Storage Manager server. When you use these options, you must update the backup-archive client options file that is used as the Local DSMAGENT Node and the Remote DSMAGENT Node.

COMPRESSIon
> This option causes the Tivoli Storage Manager API to compress data before it is sent to the Tivoli Storage Manager server. Data compression reduces traffic and storage requirements. If you enable data compression, you might cause performance issues as follows:
>
> - Processor usage increases on the system on which Tivoli Storage FlashCopy Manager is running.
> - Network bandwidth use is reduced because fewer bytes are sent.
> - Storage usage on the Tivoli Storage Manager server is reduced.
>
> If any of the following conditions exist, you might want to specify the compression yes option:
>
> - The network adapter has a data overload.
> - Communications between Tivoli Storage FlashCopy Manager and Tivoli Storage Manager server are over a low-bandwidth connection.
> - Heavy network traffic exists.
>
> It might be better to specify the compression no option in the following cases:
>
> - The computer that runs Tivoli Storage FlashCopy Manager has a processor overload; the added processor usage might cause issues for other applications that include the server. You can monitor processor and network resource usage with the Performance Monitor program that is included with Windows.
> - You are not constrained by network bandwidth; you can achieve the best performance by leaving the default compression no option unchanged and enabling hardware compaction on the tape drive, which also reduces storage requirements.
>
> The Tivoli Storage Manager administrator can override the compression option setting for the Tivoli Storage FlashCopy Manager node when the node is registered or updated by specifying, on the Tivoli Storage Manager server side, that a particular node:

- Always uses compression.
- Never uses compression.
- Leaves the decision up to the client (default value).

For VSS backups, specify the **COMPRESSIon** option in the backup-archive client options file that is used as the Local DSMAGENT Node. If the environment is configured for VSS offloaded backups, you must also specify the **COMPRESSIon** option in the backup-archive client options file that is used as the Remote DSMAGENT Node. Review the compression information available in the client documentation before you attempt to compress your data.

DEDUPLication

Client-side data deduplication is used by the Tivoli Storage Manager API to remove redundant data during backup and archive processing before the data is transferred to the Tivoli Storage Manager server.

Specify whether the Tivoli Storage Manager API deduplicates data before you send it to the Tivoli Storage Manager server. You can specify Yes or No. The default value is No. The value of the deduplication option for Tivoli Storage FlashCopy Manager applies only if the Tivoli Storage Manager administrator allows client-side data deduplication.

When both deduplication and **ENABLELANFree** options are specified, the deduplication option is ignored. A warning is also sent to the log file.

You can turn on client-side data deduplication by adding DEDUPLICATION YES to the dsm.opt file and by making sure that the deduplication prerequisites are satisfied.

ENABLELANFree

If you are able to run data backup and restore operations in a LAN-free environment, this option allows Tivoli Storage FlashCopy Manager to complete the operations. To run a LAN-free file system VSS backup to Tivoli Storage Manager server with Tivoli Storage FlashCopy Manager, specify **ENABLELANFree** *yes* in the DSMAGENT (VSS Requestor) options file. For more information about LAN-free environments, see LAN-free client-data backup: Scenario (http://www.ibm.com/support/knowledgecenter/SSSQZW_7.1.1/com.ibm.itsm.sta.doc/c_scenario_lanfree.html).

ENABLECLIENTENCRYPTKEY

This option encrypts databases during backup and restore processing by generating one random encryption key per session.

Restriction: You can back up encrypted VSS databases to only the Tivoli Storage Manager server, and not to a local Tivoli Storage FlashCopy Manager server.

Although Tivoli Storage Manager manages the key, you must have a valid database to restore an encrypted object. Specify the **ENABLECLIENTENCRYPTKEY** *yes* option in the options file. This option specifies the type of encryption to use. You can specify DES56 (56 bit), AES128 (128 bit), or AES256 (256 bit). The most secure data encryption method is AES256. The default encryption option is AES128.

In the options file, you must also specify the databases that you want encrypted by adding an include statement with the include.encrypt option.

| For VSS backups, specify the encryption options in the backup-archive
| client options file that is used as the Local DSMAGENT Node. If the
| environment is configured for VSS offloaded backups, you must also
| specify the encryption options in the backup-archive client options file
| that is used as the Remote DSMAGENT Node. Review the encryption
| information available in the client documentation before you attempt to
| encrypt your databases. If you make changes in the backup-archive
| client options file, ensure that you restart the Tivoli Storage Manager
| Client Acceptor Daemon (CAD) service for the Exchange or SQL Server.

4. Optionally, complete the following steps:

    a. Create more options files to point to another Tivoli Storage Manager server.

    b. Create more than one options file, where each file contains different
       parameters to use with a single Tivoli Storage Manager server.

Tivoli Storage FlashCopy Manager with IBM SAN Volume Controller and IBM Storwize V7000

Tivoli Storage FlashCopy Manager exploitation of IBM SAN Volume Controller and
IBM Storwize V7000 FlashCopy capabilities on Windows depends on the Volume
Shadow Copy Service (VSS) hardware provider for IBM SAN Volume Controller
and IBM Storwize V7000.

Configuration of the VSS provider for IBM SAN Volume Controller and IBM
Storwize V7000 controls the type of FlashCopy that runs when a VSS snapshot is
requested. The VSS provider configuration also controls the behavior that results
when you use VSS snapshots.

The VSS provider that supports IBM SAN Volume Controller and IBM Storwize
V7000 has the following characteristics:

- If the VSS provider is configured to use incremental FlashCopy, only one backup
  version is allowed. One backup version is the limit because each VSS snapshot
  request for a source volume causes an incremental refresh of the same target
  volume.

  In this scenario, deleting the VSS snapshot removes the snapshot from the VSS
  inventory but the FlashCopy relationship remains with the IBM SAN Volume
  Controller and IBM Storwize V7000. A subsequent VSS snapshot of the same
  source volume results in an incremental refresh of the target volume.

- Consider the following information if you configure the VSS provider to use
  space-efficient target volumes - specifically, when the background copy rate is
  set to zero:

  – The deletion of a VSS snapshot, that is represented by a target volume in a
    cascade, also causes all target volumes that depend on the volume that is
    deleted (that is, the target volumes that are already created) to be deleted. For
    example, the deletion of a snapshot that is represented by target volume *T2* in
    the sample cascade *S -> T4 -> T3 -> T2 -> T1* causes *T2* and *T1* to be deleted.
    The cascade *S -> T4 -> T3* remains after the deletion.

    When you manually delete backups on the IBM SAN Volume Controller and
    IBM Storwize V7000 space-efficient target volumes, and multiple backup
    versions exist, the backup that is deleted, and any older backups that contain
    the same volumes are deleted. The deletion might not occur until the next
    snapshot operation.

  – A FlashCopy restore of the source volume from a target volume in a cascade
    of multiple target volumes is destructive to the target volume that is restored

and to all newer targets in the cascade. For example, the restore of a snapshot that is represented by target volume *T3* in the sample cascade *S -> T4 -> T3 -> T2 -> T1* causes *T4* and *T3* to be deleted. The cascade *S -> T2 -> T1* remains after the restore.

One exception to this pattern is that a FlashCopy restore from a space-efficient target that is the only target in the cascade is not destructive.

– If a space-efficient target volume runs out of space to store the data from changed blocks on the source volume, that target volume and all target volumes that depend on that target volume go offline and render those backup versions unusable.

A space-efficient backup version is defined by a FlashCopy to a space-efficient target volume that has a background copy rate of zero. Space-efficient backup versions are not created when space-efficient target volumes are used, enabled with the `autoexpand` option, and a background copy rate is set to greater than zero. The target volumes grow to the allocated size of the source volumes when the background copy completes.

Given these characteristics, the following requirements apply to Tivoli Storage FlashCopy Manager support of IBM SAN Volume Controller and IBM Storwize V7000:

• Using a mix of space-efficient and fully allocated target volumes is not supported. You must choose to use either space-efficient or fully allocated volumes for FlashCopy targets, and set the VSS provider background copy rate parameter.

A transition from fully allocated targets to space-efficient targets is accommodated by treating fully allocated targets as if those targets are space-efficient when the background copy rate is set to 0.

• When you use space-efficient backup versions, consider these guidelines:

– Do not mix persistent and nonpersistent VSS snapshots. Use of a nonpersistent VSS snapshot that follows one or more persistent snapshots causes the older persistent snapshots to be deleted when the nonpersistent snapshot is deleted.

A VSS backup with `backupdestination` set to *TSM* creates a nonpersistent VSS snapshot. Therefore, do not follow a series of backups to local with `backupdestination` set to *TSM*. Instead, set `backupdestination` to *both* to send data to Tivoli Storage Manager while it preserves local snapshot backup versions. The settings `backupdestination=LOCAL` and `backupdestination=TSM` are mutually exclusive. Do not use both settings in your backup strategy.

– Enable the `autoexpand` option for the space-efficient target volumes to avoid out-of-space conditions.

– Allocate enough space for space-efficient target volumes to hold 120 percent of the data that is expected to change on the source volume in the time between snapshots. For example, if a database changes at a rate of 20 percent per day, VSS backups complete every six hours, and a steady rate of change throughout the day is assumed. The expected change rate between snapshots is 5 percent of the source volume (20/4). Therefore, the allocated space for the space-efficient target volumes is to be 1.2 times 5 percent equal to 6 percent of the source volume size. If the rate of change is not consistent throughout the day, allocate enough space to the target volumes to accommodate the highest expected change rate for the period between snapshots.

– Do not delete snapshots manually. Allow Tivoli Storage FlashCopy Manager to delete backup versions that are based on the defined policy to ensure that deletion occurs in the correct order. This process avoids the deletion of more backup versions than expected.

Instant restore

Tivoli Storage FlashCopy Manager supports VSS instant restore operations when multiple backup versions exist on IBM SAN Volume Controller and IBM Storwize V7000 space-efficient target volumes.

However, in this situation, VSS instant restore operations access snapshot volumes that contain dependent FlashCopy relationships. The snapshot volumes that create the dependency are typically backups that are created after the snapshot that is restored. These snapshot volumes are removed for the VSS instant restore operation to complete successfully. The backups that include the deleted snapshots are deleted from storage. Desctructive restore operations occur only when VSS instant restore operations occur in an environment where Tivoli Storage FlashCopy Manager manages multiple backup versions on IBM SAN Volume Controller and IBM Storwize V7000 space-efficient target volumes.

When multiple backup versions exist, all snapshots that are newer than the snapshot that is restored are deleted during the VSS instant restore operation. The snapshot that is restored is also deleted. When only one snapshot backup version exists, the snapshot that is restored is not deleted.

Related tasks:

"Troubleshooting VSS and SAN Volume Controller, Storwize V7000, or DS8000" on page 227

IBM System Storage requirements

Specific database, log, file, and LUN settings are required for IBM System Storage.

The IBM System Storage DS8000 series, SAN Volume Controller, Storwize V7000, and XIV storage subsystems require these settings:

* Place database files on a separate and dedicated logical volume.
* Place logs on a separate logical volume.
* When you use hardware snapshot providers, make sure the database LUNs are dedicated to only one database or application.
* If you delete a local snapshot that is stored on a IBM SAN Volume Controller or IBM Storwize V7000 Space Efficient volume (SEV) that has multiple dependent targets, you must delete the snapshots in the same order in which you created the snapshots. You must delete the oldest one first, followed by the second oldest. Failure to delete snapshots in this order can cause other snapshots of the same source to be removed.
* (IBM SAN Volume Controller and IBM Storwize V7000 only) If you use multiple target FlashCopy mappings, a mapping can stay in the copying state after all the source data is copied to the target. This situation can occur if mappings that started earlier and use the same source disk are not yet fully copied. In this situation, schedule local backups for IBM SAN Volume Controller and IBM Storwize V7000 storage subsystems at intervals greater than the time required for the background copy process to complete.

Thin provisioning

Thin provisioning is used to define a storage unit (full system, storage pool, volume) with a logical capacity size that is larger than the physical capacity assigned to that storage unit. A thin-provisioned volume is typically considered a space-efficient (SE) volume.

IBM SAN Volume Controller and IBM Storwize V7000 provide FlashCopy restore from SE target volumes and from fully allocated target volumes for which the background copy of the VSS backup is not yet completed. In addition, the hardware supports data restore operations from fully allocated target volumes for which the background copy of the VSS backup is completed. You can retain multiple FlashCopy images of a source volume as backups at a much reduced storage cost. You do not need to allocate the full size of the source volume for each backup that is generated.

For SE target volumes, the IBM SAN Volume Controller and IBM Storwize V7000 hardware architectures minimize the space that is required to maintain multiple snapshots of the same source volume. Target volumes are placed into a cascade where each target depends on changes that are recorded in target volumes of subsequent snapshots. For example, assume that four VSS snapshots of a source volume are created. S is the source and T1 through T4 are the targets. T1 is the first, chronologically, and T4 is the last. The following cascade occurs: `S -> T4 -> T3 -> T2 -> T1`.

With this type of cascade relationship, a copy-on-write process is needed only between the source volume and the last FlashCopy target. Any blocks that remain unchanged on the source volume are not copied. However, when you use the target volumes as backup versions that are managed by Tivoli Storage FlashCopy Manager, carefully consider the cascaded relationship where multiple SE target volumes have the same FlashCopy source.

More guidelines for IBM SAN Volume Controller and IBM Storwize V7000 environments

When you protect data in IBM SAN Volume Controller and IBM Storwize V7000 environments, you can change the background copy rate to have the background copies complete more quickly.

The default background copy rate is *50*. This value minimizes impact to response time for host system I/O, but it might not complete background copies as quickly as you want. Increasing the background copy rate that is used by the VSS provider to a value greater than *50* causes the background copies to complete more quickly. Do not set the background copy rate to higher than *85* because such a rate can significantly lengthen response times to I/O from host systems.

You can review the following guidelines before you attempt data backup operations:

* Determine whether to use space-efficient or fully allocated backup targets before you complete a backup operation. Provision enough target volumes in the SAN Volume Controller VSS_FREE volume group for the backup versions you require. If you use fully allocated target volumes, the capacity size of those volumes must match the size of the source volumes.
* If space-efficient virtual disks (VDisks) are used for backup targets, set the IBM VSS provider background copy value to zero by entering the `ibmvcfg set backgroundCopy 0` command. To activate the changes, restart the IBM VSS system

service after you enter the command. For more information about configuring the IBM VSS Hardware Provider for space-efficient target volumes, see the appropriate VSS-related content in the IBM SAN Volume Controller or IBM Storwize V7000 documentation.

- Do not mix COPY and NOCOPY FlashCopy relationships from the same source volume or volumes.
- Do not mix fully allocated and space-efficient VDisks (used for backup targets) in the VSS_FREE pool.
- If the protected data is on IBM SAN Volume Controller or IBM Storwize V7000 volumes, and the VDisks in the VSS_FREE pool are space efficient, you can complete VSS instant restore operations from multiple backups. However, the VSS instant restore operation in this environment is destructive.
- For FlashCopy Manager for Microsoft SQL Server, the Windows host must be attached to a IBM SAN Volume Controller or IBM Storwize V7000 cluster. The volumes that are assigned to the Windows host must be participating in the IBM SAN Volume Controller or IBM Storwize V7000 cluster.
- Make sure that IBM VSS hardware provider is installed. This provider must be configured to accommodate multiple backup versions on IBM SAN Volume Controller or IBM Storwize V7000 space-efficient target volumes.

These guidelines apply specifically to NOCOPY FlashCopy backups on IBM SAN Volume Controller or IBM Storwize V7000:

- You can create a NOCOPY FlashCopy to a space-efficient target. However, protection from physical failures to the source volume is not provided.

Make sure to review your IBM VSS hardware provider documentation for information about these two issues:

- IBM VSS hardware provider prerequisites (for example, Microsoft VSS hotfixes).
- Configuration instructions for creating FlashCopy mappings of NOCOPY backups on IBM SAN Volume Controller or IBM Storwize V7000.

Space-efficient target volumes go offline when the capacity limit of those volumes is exceeded. As a result, the current backup and all older backups (which are not reached FULL_COPY status) are lost. To avoid this situation, use the `autoexpand` option when you create space-efficient targets. This option allocates more physical storage to prevent space-efficient target volumes that are going offline.

VSS limitations for IBM SAN Volume Controller and IBM Storwize V7000

When you run a Tivoli Storage FlashCopy Manager for Exchange Server VSS backup (non-offloaded) to Tivoli Storage Manager server, the IBM SAN Volume Controller or IBM Storwize V7000 LUNs can sometimes remain mapped to the Windows host even though the backup is complete.

In this situation, the Exchange Server data is on IBM SAN Volume Controller or IBM Storwize V7000 disks and the IBM System Storage VSS Hardware Provider is used. To work around this issue, you can use a backup destination other than Tivoli Storage Manager server (BOTH or LOCAL). You can also manually unmap the volumes that are attached to the Windows host.

When you run two Tivoli Storage FlashCopy Manager for Exchange Server VSS backups and if the volumes are large, or the background copy rate is set to a low number, or both conditions occur, the second VSS backup might be presented to be in a hang state. In this situation, the Exchange Server data is on IBM SAN Volume

Controller or IBM Storwize V7000 disks. However, the second backup is waiting for the IBM SAN Volume Controller or IBM Storwize V7000 background copy of the first backup to complete before proceeding. IBM SAN Volume Controller or IBM Storwize V7000 does not allow two background copies of the same volume to occur at the same time. You might not know that the second backup is waiting for the first background copy to complete.

You might also see timeout errors if the previous IBM SAN Volume Controller or IBM Storwize V7000 background copy takes too long. To resolve this issue, schedule your VSS backups so that enough time elapses between backups to accommodate this situation. You can also increase the copy rate of the IBM SAN Volume Controller or IBM Storwize V7000 background copy.

IBM SAN Volume Controller and IBM Storwize V7000 configuration examples

The following configuration examples are scenarios that you can use to help you plan your data backup and recovery solutions.

Production application data is on standard volumes. Keep 14 snapshot backup versions. Use minimum storage space for snapshot backup versions. A full physical copy is not required. Perform two VSS backups per day.

SVC and Storwize V7000 settings
Create 14 SE target volumes for each source volume to be protected. Enable autoexpand for the SE target volumes. Add the SE target volumes to the VSS free pool.

VSS Provider settings
Set background copy rate equal to *0*.

Tivoli Storage FlashCopy Manager settings
Set the policy to retain 14 local backup versions. Schedule snapshot backups as required by using backup destination equal to local.

After 14 VSS backups are completed, the 15th VSS backup causes the oldest backup to be deleted and reuses that target set.

Production application data is on standard volumes. Keep one snapshot backup version. Use minimum storage space for snapshot backup versions. A full physical copy is not required. Perform one VSS backup per day and also send the backup to Tivoli Storage Manager.

SVC and Storwize V7000 settings
Create two SE target volumes for each source volume to be protected. Enable autoexpand for the SE target volumes. Add the SE target volumes to the VSS free pool.

VSS Provider settings
Set background copy rate equal to *0*.

Tivoli Storage FlashCopy Manager settings
Set the policy to retain two local backup versions. Schedule snapshot backups as required by using backup destination equal to both.

Set the policy for local snapshot backups to retain *N+1* backup versions so that *N* snapshot backups are available for restore. Otherwise, a local backup version might not be available if a VSS backup fails after the prior backup was deleted.

Production application data is on standard volumes. Keep one snapshot backup version. A full physical copy is required. Minimize space usage of background copies. Perform one VSS backup per day and send the backup to Tivoli Storage Manager.

SVC and Storwize V7000 settings
Create one standard target volume for each source volume to be protected. Add standard target volumes to the VSS free pool.

VSS Provider settings
Use the default background copy rate (*50*). Configure to use incremental FlashCopy.

Tivoli Storage FlashCopy Manager settings
Set the policy to retain one local backup version. Schedule snapshot backups as required by using backup destination equal to both.

When you use incremental FlashCopy, the VSS provider does not delete the single snapshot target set even though FlashCopy Manager software deletes the prior VSS snapshot before it creates a new snapshot.

Production application data is on standard volumes. Keep two snapshot backup versions. Full physical copies are required for local backup versions. Perform VSS backups every 12 hours with one backup daily sent to Tivoli Storage Manager.

SVC and Storwize V7000 settings
Create three standard target volumes for each source volume to be protected. Add standard target volumes to the VSS free pool.

VSS Provider settings
Use default background copy rate (*50*).

Tivoli Storage FlashCopy Manager settings
Set the policy to retain three local backup versions. Schedule VSS backups as follows: backup destination equal to local at *11:00*, backup destination equal to both at *23:00*.

Set the policy for local snapshot backups to retain *N+1* backup versions so that *N* snapshot backups are available for restore.

Production application data is on standard volumes. Keep four snapshot backup versions. Use minimum storage space for snapshot backup versions. A full physical copy is not required. Perform VSS backups every six hours with one backup daily sent to Tivoli Storage Manager.

SVC and Storwize V7000 settings
Create five SE target volumes for each source volume to be protected. Enable autoexpand for the SE target volumes. Add SE target volumes to the VSS free pool.

VSS Provider settings
Set background copy rate equal to *0*.

Tivoli Storage FlashCopy Manager settings
Set the policy for local snapshot backups to retain five local backup versions. Schedule VSS backups as follows: backup destination equal to local at *06:00*, *12:00*, and *18:00*, backup destination equal to both at *00:00*.

- Set policy to retain *N+1* backup versions so that N snapshot backups are available for restore

Production application data is on SE volumes. Keep two snapshot backup versions. A full physical copy is required for local backup versions. Perform VSS backups every six hours with one backup daily sent to Tivoli Storage Manager.

> **SVC and Storwize V7000 settings**
> Create three SE target volumes for each source volume to be protected. Allocate the same percentage of real storage as for source volumes. Add SE target volumes to the VSS free pool.
>
> **VSS Provider settings**
> Use default background copy rate *50*.
>
> **Tivoli Storage FlashCopy Manager settings**
> Set the policy to retain three local backup versions. Schedule VSS backups as follows: backup destination equal to local at *06:00*, *12:00*, and *18:00*, backup destination equal to both at *00:00*.

Set the policy for local snapshot backups to retain *N+1* backup versions so that *N* snapshot backups are available for restore. This setting allows thin provisioning for both source and target volumes and allows them to grow together.

Tivoli Storage Manager policy management

With Tivoli Storage FlashCopy Manager, you can manage and configure storage management policy for backups. A backup policy determines how backups on local shadow volumes are managed and retained.

Policy definitions apply only when you use a stand-alone configuration. If Tivoli Storage FlashCopy Manager is configured to use the Tivoli Storage Manager server, the policy definitions are defined on the Tivoli Storage Manager server. VSS policy bindings are still managed locally.

Tivoli Storage FlashCopy Manager uses a policy to determine how backups are retained. With Tivoli Storage FlashCopy Manager, you can create, change, and view policies, and set binding policy statements to manage your backups.

Although Tivoli Storage Manager policy determines how Tivoli Storage FlashCopy Manager backups are managed on Tivoli Storage Manager storage, backup retention on local shadow volumes is determined by version and time-based policies. Ensure that sufficient local storage space is available on local shadow volumes for a VSS backup. In addition, verify that enough available storage space is assigned to the volumes to accommodate your backup operations. The shadow copy volume that is the storage destination of a snapshot must have sufficient space for the snapshot.

Environment and storage resources also affect how many backup versions are maintained on local shadow volumes. The amount of space that is required depends on the VSS provider that you use.

How backups expire based on policy

Backups expire based on Tivoli Storage FlashCopy Manager policy.

Expiration is the process by which SQL Server, Exchange Server, or custom application and file system backup objects are identified for deletion when the expiration date is past or the maximum number of backup versions that must be retained is reached.

The data value depends on the business needs that are identified by the recovery point objective (RPO) and the recovery time objective (RTO) of your enterprise. For example, legal, operational, and application requirements affect how data must be protected to meet these RPO and RTO demands. With Tivoli Storage FlashCopy Manager, you can specify the number of snapshot backups to retain and the length of time to retain them.

Backups can expire during the query, backup, or restore operation of a Tivoli Storage FlashCopy Manager session.

A number of backup copies are retained. When the maximum number of backup copies is reached, the oldest backup expires and is deleted. The maximum number of backup copies is specified in the Tivoli Storage FlashCopy Manager policy.

A backup copy is retained for a maximum number of days. The maximum number of days that a backup can be retained is specified in the Tivoli Storage FlashCopy Manager policy.

Impact of policy on Tivoli Storage FlashCopy Manager for Windows

Tivoli Storage Manager policy determines how FlashCopy Manager for Microsoft Exchange Server and FlashCopy Manager for Microsoft SQL Server backups are managed on Tivoli Storage Manager storage and on local shadow volumes when the environment is configured for VSS operations.

The Tivoli Storage Manager server recognizes FlashCopy Manager for Microsoft Exchange Server and FlashCopy Manager for Microsoft SQL Server as a node.

Data that is backed up to Tivoli Storage Manager storage from the FlashCopy Manager for Microsoft Exchange Server or FlashCopy Manager for Microsoft SQL Server node is stored and managed according to settings that are specified for Tivoli Storage Manager server policy items.

Tivoli Storage Manager policy can manage the VSS backups that are placed in Tivoli Storage Manager server storage pools. The Tivoli Storage Manager server manages VSS backups.

If you use IBM Tivoli Storage Manager for Copy Services and upgrade to FlashCopy Manager for Microsoft Exchange Server or FlashCopy Manager for Microsoft SQL Server, with the license for Tivoli Storage Manager for Copy Services, you can store VSS backups to local shadow volumes.

The number of local backup versions that are maintained by the Tivoli Storage Manager server is determined by the value that is specified by the Tivoli Storage Manager server **verexists** parameter, which is defined in the copy group of the management class to which the local backup belongs. Allocation of target volume sets is not necessary when you use the system provider. When you do not use the

system provider, the number of target volume sets that are allocated for local backups must be equal to the **verexists** parameter. Target volume sets are not applicable to XIV.

For example, if verexists=3, then at least three sets of target volumes must be allocated for the backup to complete successfully. If only two sets of target volumes are allocated, the third and subsequent backup attempts fail. If more sets of target volumes exist than the number specified by the **verexists** parameter, these sets are ignored by the Tivoli Storage Manager server. A high number of local backup versions cannot be stored. If you want to have *N* number of local backup versions, set the **verexists** parameter to *N + 1*.

When you use the configuration wizard in the GUI, the **VSSPOLICY** parameter is set in the file.

Depending on the policy management settings, LUNs can also be reused for new backups. When a new backup is requested and the maximum number of versions is reached, the software deletes the oldest snapshot (backup) to make space for the new snapshot. If the new request fails after the oldest snapshot is deleted, you have one less backup version than expected.

Policy management of local backups is required to reconcile the local backup repository with the information that is stored on the Tivoli Storage Manager server. For example, if target volume LUNs that are used for a local backup are removed from the storage subsystem, the information that represents the backup on the Tivoli Storage Manager server must be reconciled. Similarly, if the Tivoli Storage Manager server policy determines that a local backup copy is no longer needed, the local backup manager must free the target volume LUNs to the storage subsystem. The release of the local backup manager is necessary so that these LUNs can be used for future backup operations. Tivoli Storage Manager automatically detects when these situations occur and completes the reconciliation.

Consider the scenario where you use a two-member DAG, named *MEMBER1* and *MEMBER2*. When you complete a backup to **LOCAL** on *MEMBER1* and complete more backups on *MEMBER2*, the backups to **LOCAL** on *MEMBER1* do not expire until the next time you complete a backup, query, or deletion operation on *MEMBER1*. In this scenario, you might use more storage than specified by **verexists**.

Storage space considerations for local shadow volumes

Tivoli Storage Manager requires that sufficient storage space is available to create shadow volumes for VSS backup processing. Even when the VSS backup destination is the Tivoli Storage Manager server, storage space to create a shadow volume is still required, but only on a temporary basis.

The value of the **verexists** parameter that is specified for your local backup policy determines the number of backup versions to retain on local shadow volumes. Therefore, a verexists=1 setting causes the existing backup to be deleted on local shadow volumes (during a VSS backup to Tivoli Storage Manager server storage) to create enough temporary space for the new snapshot. Therefore, if you want to keep *N* backups on local shadow volumes and you also do VSS backups to Tivoli Storage Manager server storage, provision enough storage space on local shadow volumes and specify verexists=*N+1*.

If you keep only one backup, the same disk is reused. The process initially removes the existing backup and attempts the new backup. If the new backup fails, no backups exist.

If you retain multiple backups (snapshots), the oldest backup is removed before a new backup is created. If the new backup fails, you might have one less backup than specified by the policy. For example, if you specify to retain five backups, but the last backup fails, you might have only four backup versions.

Ensure that you specify a **verexists** value that accommodates your VSS backup goals. If you have limited storage space for VSS operations and are restricted to a `verexists=1` setting, you can use the **Backup Destination** `BOTH` option. This option stores the backup on local shadow volumes and sends a copy to Tivoli Storage Manager server storage.

VSS backups (that FlashCopy Manager for Microsoft Exchange Server and FlashCopy Manager for Microsoft SQL Server create and store on local shadow volumes) can be changed and deleted from outside of Tivoli Storage Manager control. For example, enter the Microsoft **VSSADMIN DELETE SHADOWS** command to remove a VSS backup that is managed by Tivoli Storage Manager. Tivoli Storage Manager is not able to prevent the removal of the backup. In such a situation, Tivoli Storage Manager detects that the backup is removed and reconciles its index of available backups with what is on local shadow volumes. Because backups can be removed, it important for you to establish a strategy that protects VSS backup data that is stored on local shadow volumes from being compromised.

Policy considerations for VSS backups

Your Tivoli Storage Manager policy for managing VSS backups depends on your environment:
- Overall backup strategy.
- Length of time that VSS backups are on Tivoli Storage Manager server storage.
- Number of VSS backup versions on Tivoli Storage Manager server storage.
- Types of VSS backups that are on Tivoli Storage Manager server storage.
- Number of VSS backup versions on local shadow volumes.
- Types of VSS backups on local shadow volumes.
- The amount of available target volume storage that is provisioned for VSS operations.

Setting local backup policy

Local backup policy determines how different backup versions are retained on local shadow volumes.

Before you begin

Backup retention on local shadow volumes is determined by your version and time-based policies. Sufficient local storage space must be available on local shadow volumes for a VSS backup strategy to be successful. The amount of space that is required depends on the VSS provider that is used.

About this task

When Tivoli Storage FlashCopy Manager is connected to a Tivoli Storage Manager server, the backup policy is defined by the server. When Tivoli Storage FlashCopy Manager is configured in stand-alone mode, you can define the backup policy.

Use this procedure to create and manage your local backup policies.

Procedure

1. Start Microsoft Management Console (MMC).
2. In the tree view, click **IBM Tivoli Storage Manager**.
3. Select an **Exchange Server**, **SQL Server**, or **File System** instance.
4. In the Actions pane, click **Properties**.
5. From the list of available property pages, select **Policy Management**. The existing local policies are displayed.
6. Add, delete, or update local policies for data retention. When you add a policy, specify a unique policy name. If a unique policy name is not entered, the policy is not saved. Double-click to edit a policy field. To specify no limit on the number of snapshots to keep or the number of days to keep a snapshot, enter NL.
7. Click **Save**.

What to do next

After you add a policy, you can bind an object to that policy. Updates to existing, bound policies are saved, but do not take effect until the next backup is run.

Specifying policy binding statements

Policy binding statements associate Microsoft SQL Server, Microsoft Exchange Server, and custom application and file system backups to a management policy.

Before you begin

Use the same policy binding method for SQL Server, Exchange Server, or custom application and file system backups. Define a policy statement in the respective configuration file. A custom application or file system statement identifies the name of the volume or mount point directory (`component`) instead of the name of the database (`object name`).

For Exchange Database Availability Groups (DAG), all the DAG members that share the DAG node must use the same VSS policy.

About this task

A default policy binds any backups that are not explicitly bound to a named policy. Policy binding is available in environments with or without a Tivoli Storage Manager server.

For custom application and file system backups, policy binding statements are stored in the Tivoli Storage FlashCopy Manager configuration file, `fcmcfg.xml`, by default.

Procedure

1. Specify the policy binding statements to use to bind snapshots to a policy, either by using the GUI or by manually adding binding statements to the configuration file.

   A policy statement is defined in the respective configuration file, for example, in the Tivoli Storage FlashCopy Manager for Exchange Server or Tivoli Storage FlashCopy Manager for SQL Server configuration file:

   ```
                   server name    object name      backup type   backup dest   mgmt class
   VSSPOLICY       *              "Accounting"     FULL          LOCAL         MC_1
   VSSPOLICY       SERVER_3       "Human           INCR          LOCAL         MC_6
                                   Resources"
   ```

2. For custom application and file system backups, modify the default fcmcfg.xml configuration file only with Microsoft Management Console (MMC) or the **FCMCLI UPDATE VSSPOLICY**, **FCMCLI INSERT VSSPOLICY**, or **FCMCLI DELETE VSSPOLICY** commands.

   For custom application and file system data, the following sample command inserts a new VSS policy binding statement at the position that is specified by the **SEQnumber** parameter:

   ```
   FCMCLI INSERT VSSPOLICY "* L:\mountdir FULL LOCAL MC1Q11" /SEQnumber=2
   ```

   The following items in the quotation marks represent the policy definition:
   - Server name = *
   - Component = L:\mountdir
   - Backup type= FULL
   - Backup destination = LOCAL
   - Management class = MC1Q11

Binding backups to a policy

You can add, update, delete, or change the processing order of existing binding statements.

About this task

A backup policy determines how backups on local shadow volumes are managed and retained.

Procedure

1. Start Microsoft Management Console (MMC).
2. In the tree view, click **IBM Tivoli Storage Manager**.
3. Select an **Exchange Server**, **SQL Server**, or **File System** instance.
4. In the Actions pane, click **Properties**.
5. From the list of available property pages, select **VSS Policy Binding**.
6. Add, update, delete, or change the processing order of existing binding statements.

   Tip: You can use a wildcard character (*) to represent all characters. For example, in the **Server** field, enter the wildcard character (*) to bind the policy to all Exchange Servers, all SQL Servers, or all custom application and file system data.

7. Optional: To change the processing order, use **Move Up** and **Move Down**. Policies are processed from the end to the beginning of the file and processing stops at the first match. To ensure that more specific statements are processed before general statements, you must list the more general specification before the more specific statement. Otherwise, the more general specifications match the target before the more specific specifications are reached.

8. Save any new or changed binding statement.

9. Optional: Verify new or updated policies and bindings.

   a. Run one or more test backups.

   b. On the **Recover** tab, verify the management classes that are bound to your test backups.

VSSPOLICY statements for backup types

For VSS backups, VSSPOLICY statements are used to associate VSS backups with management classes. When you change from legacy backups to VSS backups, pay attention to the VSSPOLICY statements that you set for the backup.

The VSSPOLICY statements are entered in the configuration file, for examples, `tdpexc.cfg` and `fcmcfg.xml`. A configuration file can include multiple VSSPOLICY statements. The configuration file is read from the end to the beginning of the file. If you are familiar with the Tivoli Storage Manager backup-archive client configuration file, the VSSPOLICY statements in the `tdpexc.cfg` file are read like the INCLUDE statements that are configured in the `dsm.opt` file.

If no VSSPOLICY statements are included in the configuration file, or if the VSSPOLICY statements do not match the type of backup that is set up, the default management class for the policy domain is used. Backup expiration parameters for the default management class might differ from the settings that are used for preexisting legacy backups. For example, the backup expiration period might be set to 30 days. This setting means that after 30 days, the backup is deleted. Check the parameters to verify that the backups expire according to the business needs of your environment.

Any policy changes in the `tdpexc.cfg` and `fcmcfg.xml` files require that you restart the Tivoli Storage Manager Client Acceptor Daemon (CAD), Tivoli Storage Manager Remote Client Agent (DSMAgent), and the Tivoli Storage Manager Scheduler Service for Exchange Server. If the DSMAgent service state is set to Manual (Started), stop the service. The DSMAgent service starts when a VSS backup is initiated, but if the service is started and you change the policy settings, the policy settings do not take effect until you restart the service.

Sample VSSPOLICY statements

The following code sample presents the syntax of a VSSPOLICY statement:

```
VSSPOLICY srv name db-name backup-type backup-dest mgmtclass
```

The Exchange Server name is defined by the *srv name* variable. You can enter the wildcard character (*) to match all Microsoft Exchange Servers.

The database name is defined by the *db-name* variable. You can enter the wildcard character (*) to match all Microsoft Exchange Server groups. Because the name can include a space, use the quotation marks to encapsulate the database name.

The *backup-type* variable specifies the backup type, for example, `FULL` or `COPY` or the wildcard character (*) that matches all backup types.

The *backup-dest* variable specifies the backup destination. Use the `TSM` option to back up data to Tivoli Storage Manager, the `LOCAL` option to back up data to a local disk, or the wildcard character (*) to match both backup types.

The *mgmtclass* variable specifies the Tivoli Storage Manager management class that is used to bind the types of specified backups.

The following code is an example of a VSSPOLICY statement. This code sample is part of the sample configuration file that is included with the software that you installed. In this example, the VSSPOLICY statement is commented out. To make the VSSPOLICY statement effective, uncomment the VSSPOLICY statement by removing the initial asterisk character (*).

```
-------------------------------------------------------------
* Sample VSSPOLICY Statements
* -------------------------------------------------------------
* These statements are used to bind VSS backup to specific TSM
* Server management classes. Adjust the statements to meet your
* needs and remove the leading asterisks to make them operational.
* Note: Matching of these policy bindings are from the bottom up.
***********************************************************************

* Server      Database        Name   BU Type   BU Dest.  Mgmt Class
* ------      ------------    ----   ---------  --------  ----------
  VSSPOLICY   *               *      FULL       TSM       IUG_TSM
  VSSPOLICY   *               *      COPY       TSM       IUG_TSM_COPY
  VSSPOLICY   *               *      COPY       LOCAL     IUG_COPY
  VSSPOLICY   *               *      FULL       LOCAL     IUG_LOCAL
  VSSPOLICY   *               "HR"   FULL       LOCAL     MCLASS3
  VSSPOLICY   SERVER1         "ACT"  *          LOCAL     MCLASS2
  VSSPOLICY   SERVER1         "SG 1" *          TSM       IUG1
***********************************************************************
```

In this example, the following policy rules are specified:
- Any VSS backups of the *SG 1* database on the Exchange Server *SERVER1* to Tivoli Storage Manager are bound to the management class *IUG1*.
- Any VSS backups of the *ACT* database on the Exchange Server *SERVER1* to *LOCAL* are bound to the management class *MCLASS2*.
- Full VSS backups of the *HR* database on any Exchange Server to *LOCAL* are bound to the management class *MCLASS3*.
- Full VSS backups of any other database on any other Exchange Server to *LOCAL* are bound to the management class *IUG_LOCAL*.
- Copy VSS backups of any other database on any other Exchange Server to *LOCAL* are bound to the management class *IUG_COPY*.
- Copy VSS backups of any other database on any other Exchange Server to Tivoli Storage Manager are bound to the management class *IUG_TSM_COPY*.
- Full VSS backups of any other database on any other Exchange Server to Tivoli Storage Manager are bound to the management class *IUG_TSM*.
- This policy is complete. Any type of backup matches a rule because of the wildcard VSSPOLICY statements at the top of the file. Use these types of statements so that you explicitly state what management class is used.

Managing Exchange Database Availability Group members by using a single policy

You can prevent Tivoli Storage FlashCopy Manager from backing up each database copy separately by backing up the database copies under a single Database Availability Group (DAG) node.

About this task

For Microsoft Exchange Server databases in a DAG environment, several online copies of a database are maintained for high availability. To reduce the number of database backups that are created, set up to back up database copies from different DAG members under a single DAG node.

All database copies can be managed as a single entity regardless of where the database copies are backed up from, and whether the backup copies are active or passive at the time of the backup. You can set up a minimum interval between database backups, which ensures that the database copies are not backed up at the same time or backed up too frequently.

Procedure

1. Use the Tivoli Storage Manager Configuration Wizard to configure the DAG node.
   - For VSS backups to Tivoli Storage Manager, ensure that you specify a node name in the **DAG Node** field on the TSM Node Names page in the wizard. This node is used to back up all the DAG.
   - For a stand-alone configuration, select the **Exchange workload** in Microsoft Management Console (MMC) and click **Properties**. Click **General**, and specify a node name in the **Back up DAG databases to common node** field.
   - For best results, ensure that all the DAG members are configured with the same DAG node name.
2. Ensure that the Tivoli Storage Manager administrator issues the **grant proxynode** command for each member server in the DAG to grant permission to the DAG member server to act as a proxy for the DAG node. If the configuration wizard is not used to configure the Tivoli Storage Manager server, the proxies must be defined. In addition, the backup-archive client node and the Data Protection node need proxynode authority. The backup-archive client node also needs proxynode authority to act on behalf of the Data Protection node. For example, the Tivoli Storage Manager administrator can enter the following commands on the Tivoli Storage Manager server:

   ```
   register node backup_archive_client_node password
   register node data_protection_node password
   grant proxynode target=data_protection_node agent=backup_archive_client_node
   register node DAG_node password
   grant proxynode target=DAG_node agent=backup_archive_client_node
   grant proxynode target=DAG_node agent=data_protection_node
   ```

3. Ensure that the DAG node and the Tivoli Storage FlashCopy Manager node are in the same policy domain.

   For a stand-alone configuration, you can set or verify the policy domain name in the **VSS Policy Binding** property page for the Exchange Server workload.
4. Create a backup schedule and specify the **/MINIMUMBACKUPINTERVAL** parameter in a backup command. You must use the Tivoli Storage Manager scheduler to run this schedule. For example, to use a single Tivoli Storage Manager schedule to back up exactly one copy of a database that contains multiple copies, complete the following steps:

    a. Create a command script that is named `C:\BACKUP.CMD` by entering this command:

       `TDPEXCC BACKUP DB1 FULL /MINIMUMBACKUPINTERVAL=60`

    b. Copy the `BACKUP.CMD` file to all the DAG members.

    c. Create one schedule and associate all the nodes with this schedule.

When the backup schedule runs, the minimum backup interval is observed and only one backup is created.

5. Optional: To decrease the load on the production Exchange Server, you can specify that the backups are taken from a valid passive database copy. If a valid passive copy is not available, the backup copy is created from the active copy of the database. To add this specification, add **/PREFERDAGPASSIVE** to a backup command. For example:

`TDPEXCC BACKUP DB1 FULL /MINIMUMBACKUPINTERVAL=60 /PREFERDAGPASSIVE`

Chapter 3. Installing and upgrading

Tivoli Storage FlashCopy Manager wizards guide you through the installation, upgrade, and configuration of Tivoli Storage FlashCopy Manager. After you complete the setup and configuration wizards, your system is ready to back up and restore data.

Tivoli Storage FlashCopy Manager provides the following wizards for installation and configuration tasks:

Setup wizard
> Use this wizard to install or upgrade Tivoli Storage FlashCopy Manager on your computer.

Standalone configuration wizard
> Use this wizard to configure Tivoli Storage FlashCopy Manager to manage snapshot backups as a standalone computer.

Tivoli Storage Manager configuration wizard
> Use this wizard to configure Tivoli Storage FlashCopy Manager in an environment that is integrated with Tivoli Storage Manager. This integration provides data protection and centrally managed, policy-based administration.

Mailbox restore only configuration wizard
> Use this wizard to configure Tivoli Storage FlashCopy Manager to restore mailboxes from mounted EDB files. Extra data protection features are not available. This configuration is ideal when you have a specific task to complete and do not want the additional Tivoli Storage FlashCopy Manager software functions.

Prerequisites

Before you install Tivoli Storage FlashCopy Manager , ensure that your system meets the minimum hardware, software, and operating system requirements.

To run data protection operations with Tivoli Storage Manager server, you must install the correct product license in the correct installation directory. If you cannot configure the software, verify that the product license file is correctly installed in one of these directories:

- For Data Protection for Microsoft Exchange Server, install the `excclient.lic` license file in the Data Protection for Microsoft Exchange Server installation directory.
- For Data Protection for Microsoft SQL Server, install the `sqlclient.lic` license file in the Data Protection for Microsoft SQL Server installation directory.
- For Tivoli Storage FlashCopy Manager, install the `fcmclient.lic` license file in the Tivoli Storage FlashCopy Manager installation directory.

Tivoli Storage FlashCopy Manager provides the following wizard to guide your installation and initial configuration tasks:

Setup wizard
> Use this wizard to install or upgrade Tivoli Storage FlashCopy Manager on your computer.

The installation wizard verifies many of the prerequisites as part of its verification process. However, some prerequisites cannot be automatically verified, for example, the host bus adapter (HBA) or multipath I/O (MPIO) software that is required for your VSS provider.

In addition, the Tivoli Storage FlashCopy Manager product comprises multiple components that support different operating systems, databases, and applications. Hardware and software requirements change over time due to maintenance updates and the addition of operating system, application, and other software currency support. Before you begin the installation process, always verify that your environment meets the hardware and software prerequisites.

For more information, review the Hardware and Software Requirements technote that is associated with the level of your Tivoli Storage FlashCopy Manager program. This technote is available at this web page: Tivoli Storage FlashCopy® Manager - All Requirements Doc (http://www.ibm.com/support/docview.wss?uid=swg21427692). Follow the link to the requirements technote for your specific release or update level.

If you are protecting Tivoli Storage FlashCopy Manager databases on Microsoft Windows Server 2008 and later versions, you must install Microsoft Windows Powershell Version 3.0 or later versions. For more information, see Microsoft TechNet: Installing Windows PowerShell (http://technet.microsoft.com/en-us/library/hh847837.aspx).

Installation process might require a restart

If you do not install all of the prerequisites before you start the installation process, the installation process might require a restart. As part of the installation process, one or more Microsoft C++ redistributable packages are installed, if they are not already installed on the Windows workstation. These packages can also be automatically updated by the Windows Update service. If the packages are updated, the update can cause the system to restart when you start the installation program.

Additionally, because the Microsoft Visual Studio C++ redistributable package is a shared Windows component, other applications that have dependencies on the package might be stopped or restarted by Windows as part of the installation or upgrade of the C++ redistributable package. Schedule installations and upgrades during a maintenance window when other applications are not be adversely affected if they are stopped or restarted when the C++ redistributable package is installed. Monitor other applications after the installation is complete to see whether any applications were stopped and not restarted.

Virtualization environment resources

For more information about the virtualization environments that you can use with Tivoli Storage FlashCopy Manager, see this web page: Tivoli Storage Manager (TSM) guest support for Virtual Machines and Virtualization (http://www.ibm.com/support/docview.wss?uid=swg21239546)

Installing Tivoli Storage FlashCopy Manager for Windows

The setup wizard guides you through installing Tivoli Storage FlashCopy Manager on your computer.

Before you begin

Before you install and configure Tivoli Storage FlashCopy Manager, verify that you satisfy the hardware and software requirements.

You can obtain the installation package from the product DVD or from an IBM download site.
- If you obtain the package from the product DVD, ensure that the installation files are visible on the DVD drive.
- If you obtain the package from an IBM download site, you must extract the installation files.

About this task

Tivoli Storage FlashCopy Manager is available in both licensed and maintenance packages. The installation process differs based on the package type.

Licensed package
> Includes a license enablement file that is only available from your software distribution channel, such as Passport Advantage®, and includes the initial General Availability release of a product or component.

Maintenance update (fix pack or interim fix package)
> Available from the maintenance delivery channel, and can sometimes be used to refresh the software distribution channel. Maintenance packages do not contain license enablement files and must be installed after a licensed package.
>
> See the README.FTP file for information about how to install a fix pack or interim fix package. The README.FTP file is available in the same directory where the maintenance package is downloaded.

Procedure

1. Log on with administrator credentials and complete the following steps:
   a. Download the appropriate package file from one of the following websites, or you can access the files from the product DVD:
      - For a first-time installation or a new release go to Passport Advantage at IBM Passport Advantage. Passport Advantage is the only website from which you can download a licensed package file.
      - For a maintenance fix, go to this FTP site and to the directory that contains the maintenance fix version that you require, Index of Tivoli Storage FlashCopy Manager patch files (ftp://public.dhe.ibm.com/storage/tivoli-storage-flashcopymanager/patches/).
   b. If you download the package from one of the download sites, complete the following steps:
      - Verify that you have enough space to store the installation files when they are extracted from the product package.
      - Change to the directory where you placed the executable file.

Tip: In the next step, the files are extracted to the current directory. The path must contain no more than 128 characters. Extract the installation files to an empty directory. Do not extract the files to a directory that contains previously extracted files, or any other files.

- Either double-click the executable file, or enter the following command on the command line to extract the installation files. The files are extracted to the current directory.

  ```
  package_name.exe
  ```

  where `package_name` is like this example:

  ```
  4.1.1.0-TIV-FCM-Win.exe
  ```

  c. Follow the installation instructions that are displayed.

  d. Click **Finish** to complete the installation of Tivoli Storage FlashCopy Manager.

2. Configure Tivoli Storage FlashCopy Manager by using the configuration wizard.

   a. Start Microsoft Management Console (MMC). Click **Start** > **All Programs** > **Tivoli Storage FlashCopy Manager** > **FlashCopy Manager Management Console**. When you start MMC, a welcome page is displayed. If Tivoli Storage FlashCopy Manager is not configured, the configuration wizard starts.

   b. If the configuration wizard does not start automatically, go to **IBM Tivoli Storage Manager** > **Dashboard** > **Manage** > **Configuration** > **Wizards** in the tree view, and select one of the following wizards:

      - Setup wizard
      - Standalone configuration wizard
      - Tivoli Storage Manager configuration wizard
      - Mailbox Restore Only configuration wizard

      Click **Start** in the Actions pane.

   c. In the configuration wizard, select the applications to protect, verify requirements, provision, and configure.

3. After you complete the configuration wizard, verify your configuration by selecting each workload instance in the tree view and completing the following steps:

   a. Click the **Automate** tab.

   b. Click **Open** in the toolbar.

   c. Type `verify`. The following three file names are listed.

      ```
      verify_sql.txt
      verify_exc.txt
      verify_fs.txt
      ```

      The `verify_fs.txt` file is used with MMC and is part of the base product installation.

   d. Select and open the file that matches the workload.

   e. Click **Run** in the toolbar.

   When the commands run with no warnings or errors, the configuration is verified.

   The `verify_sql.txt` file contains the following commands:

   ```
   query tdp
   query tsm
   query sql
   ```

The `verify_exc.txt` file contains the following commands:

```
query tdp
query tsm
query exchange
```

The `verify_fs.txt` file contains the following commands:

```
query component
query config
```

4. Back up and restore a set of test data. Refine your configuration settings as necessary.
5. Define the policy settings and scheduled operations.

Related concepts:

"Security requirements for Microsoft Exchange Server data" on page 18

Silently installing Tivoli Storage FlashCopy Manager

You can use the setup program to implement a silent (unattended) installation of Tivoli Storage FlashCopy Manager.

Before you begin

Before you install and configure Tivoli Storage FlashCopy Manager, verify that you satisfy the hardware and software requirements.

You must install two components: Microsoft Management Console (MMC) and Tivoli Storage FlashCopy Manager Server. The setup programs for these components are on the installation media (where `x:\` is your DVD drive):

Tivoli Storage FlashCopy Manager Management Console setup program
(64-bit) `x:\fcm\x64\mmc\4120\enu\setup.exe`

About this task

To ensure a consistent configuration and to avoid having 25 different people enter Tivoli Storage FlashCopy Manager parameters, an administrator can choose to produce an unattended installation package and make it available to the 25 sites. The installation package can be placed on a DVD and sent to each of the remote sites, or the package can be placed in a shared directory on a file server for distribution across the different sites.

Procedure

1. Enter the following commands to silently install both components to the default installation directories:

   ```
   x:\fcm\x64\mmc\4120\enu\setup.exe /s /v/qn
   ```

   where `x:\` is your DVD drive.

   You must substitute the appropriate feature when you install a language other than English.

2. Run the `setup.exe` file with the following options. Specify each command on a single line from a Run as Administrator command line. The following examples are commands that specify the target directory, the features, language transform, start suppression, and logging.

   ```
   x:\fcm\x64\mmc\4120\enu\setup.exe /s /v"INSTALLDIR=
   \"C:\Program Files\Tivoli\"ADDLOCAL=\"Client\" TRANSFORM=1033.mst
   REBOOT=ReallySuppress/qn /l*v\"C:\Program Files\Tivoli\FlashCopyManager\logs\
   fcm.log\""
   ```

3. Review these guidelines as you complete the installation process:
   - You must place a backslash (\) before each quotation mark that is within an outer set of quotation marks (").
   - For a single-line command, press **Enter** only when all the parameters are entered.
   - You must place quotation marks (") around the following text:
     - A directory path that contains spaces.
     - An argument that specifies multiple features. Although you must use quotation marks around the complete argument, you must still place a backslash before each internal quotation mark.
   - All features that are listed in a custom installation must be listed after the `addlocal` option.
   - Setting the `rebootyesno` option to *No* applies only to the installation of the Tivoli Storage FlashCopy Manager software. The installation package includes a number of prerequisites that are installed by Tivoli Storage FlashCopy Manager. Ensure that all the prerequisites are installed before you start the silent installation, and then set the `rebootyesno` option to *No* to avoid a restart after the silent installation process finishes.

Manually installing language packs

When run in an environment other than English, the Tivoli Storage FlashCopy Manager setup program (`setupfcm.exe`) automatically starts the corresponding language pack setup program.

About this task

The component provisioning steps in the stand-alone and Tivoli Storage Manager configuration wizards also installs language packs automatically for the components that are based on the language for which the system is configured.

To enable the software for more languages, go to the language folder of each component on the Tivoli Storage FlashCopy Manager media and run the setup program.

Procedure

- To install another language for FlashCopy Manager MMC Snap-in and Base System Services, run the following command:
  - (64 bit): `fcm\x64\mmc\4120\{chs|cht|deu|enu|esp|fra|ita|jpn|kor|ptb}\setup.exe`
  - (32 bit): `fcm\x86\mmc\4120\{chs|cht|deu|enu|esp|fra|ita|jpn|kor|ptb}\setup.exe`
- To install another language for Tivoli Storage FlashCopy Manager for Exchange Server, run the following command:
  - `fcm\x64\exc\7120\{chs|cht|deu|enu|esp|fra|ita|jpn|kor|ptb}\setup.exe`
- To install another language for Tivoli Storage FlashCopy Manager for SQL Server, run the following command:
  - (64 bit): `fcm\x64\sql\7120\{chs|cht|deu|enu|esp|fra|ita|jpn|kor|ptb}\setup.exe`
  - (32 bit): `fcm\x86\sql\7120\{chs|cht|deu|enu|esp|fra|ita|jpn|kor|ptb}\setup.exe`

- To install another language for the Tivoli Storage FlashCopy Manager VSS Requestor, run the following command:
  - (64 bit): `fcm\x64\vss\7120\{chs|cht|deu|enu|esp|fra|ita|jpn|kor|ptb}\setup.exe`
  - (32 bit): `fcm\x86\vss\7120\{chs|cht|deu|enu|esp|fra|ita|jpn|kor|ptb}\setup.exe`

Example

For example, install the French language pack for the FlashCopy Manager MMC Snap-in and Base System Services on 64-bit Windows. Enter the following command (where the media is mounted on the D drive):

`d:\fcm\x64\mmc\4120\fra\setup.exe`

Rerun the preceding command for each installed Tivoli Storage FlashCopy Manager component. The path segment that contains numbers is version information that changes over time. For example, the FlashCopy Manager MMC Snap-in and Base System Services version is listed as 4120. This value changes to match the component version that is delivered in each Tivoli Storage FlashCopy Manager release.

Installing Tivoli Storage FlashCopy Manager for SQL Server on Windows Server Core

If you are protecting Microsoft SQL Server 2012 and later versions in a Windows Server Core environment, you can use the setup wizard to install Tivoli Storage FlashCopy Manager.

Before you begin

Before you install and configure Tivoli Storage FlashCopy Manager, verify that you satisfy the hardware and software requirements.

Procedure

1. Log on as an administrator.
2. Install Tivoli Storage FlashCopy Manager for SQL Server by using the setup wizard.
   a. Insert the Tivoli Storage FlashCopy Manager for SQL Server product DVD into your DVD drive.

   If autorun is enabled, the installation dialog starts automatically when the DVD loads. Otherwise, select **Start** > **Run**, and at the prompt, specify: `x:\setup.exe`, where `x:` is your DVD drive, and click **OK**.
   b. Follow the installation instructions that are displayed.
   c. Click **Finish** to complete the installation. If prompted, restart your system.

What to do next

You can complete an unattended installation of Tivoli Storage FlashCopy Manager for SQL Server on Windows Server Core.

Silently installing Tivoli Storage FlashCopy Manager for SQL Server on Windows Server Core

If you are protecting Microsoft SQL Server 2012 or later versions in a Windows Server Core environment, you can use silent installation methods to install Tivoli Storage FlashCopy Manager without any user interaction.

About this task

You can use either the setup program or the Windows installer (MSI) program for the unattended installation of Tivoli Storage FlashCopy Manager.

Silently installing Tivoli Storage FlashCopy Manager for SQL Server on Windows Server Core with the setup program

You can use the setup program to silently install Tivoli Storage FlashCopy Manager for SQL Server on Windows Server Core.

Before you begin

Before you install and configure Tivoli Storage FlashCopy Manager, verify that you satisfy the hardware and software requirements.

Tivoli Storage FlashCopy Manager must be installed from an account that is a member of the local Administrators group for the system on which the SQL Server is running.

About this task

The Tivoli Storage FlashCopy Manager for SQL Server setup program is on the installation media (where `x:` is your DVD drive):

- (32-bit) `x:\fcm\x86\mmc\4120\enu\setup.exe`
- (64-bit) `x:\fcm\x64\mmc\4120\enu\setup.exe`

Procedure

1. Enter the following command to silently install Tivoli Storage FlashCopy Manager for SQL Server to the default installation directory:

   `x:\fcm\aaa\sql\7120\enu\setup.exe /s /v/qn`

   where `x:` is your DVD drive and `aaa` is either *x64* or *x86*.
2. Run the `setup.exe` file with the following options. Specify each command on a single line. The following examples are commands that specify the target directory, the features, language transform, start suppression, and logging.
3. Review these guidelines as you complete the installation process:
   - You must place a backslash (\) before each quotation mark that is within an outer set of quotation marks (").
   - For a single-line command, press **Enter** only when all the parameters are entered.
   - You must place quotation marks (") around the following text:
     - A directory path that contains spaces.
     - An argument that specifies multiple features. Although you must use quotation marks around the complete argument, you must still place a backslash before each internal quotation mark.

- All features that are listed in a custom installation must be listed after the **addlocal** option.
- Setting the **rebootyesno** option to *No* applies only to the installation of the Tivoli Storage FlashCopy Manager for SQL Server software. The installation package includes a number of prerequisites that are installed by Tivoli Storage FlashCopy Manager for SQL Server. Ensure that all the prerequisites are installed before you start the silent installation, and then set the **rebootyesno** option to *No* to avoid a restart after the silent installation process finishes.

What to do next

You are ready to configure Tivoli Storage FlashCopy Manager for SQL Server.

Silently installing Tivoli Storage FlashCopy Manager for SQL Server on Windows Server Core with the Microsoft Installer program

You can use the Microsoft Installer (MSI) program, msiexec.exe, to implement a silent installation of Tivoli Storage FlashCopy Manager for SQL Server. If you are protecting Microsoft SQL Server 2012 and later versions, you can also use the MSI program to silently install Tivoli Storage FlashCopy Manager for SQL Server on Windows Server Core.

Before you begin

Tivoli Storage FlashCopy Manager must be installed from an account that is a member of the local Administrators group for the system on which the Server is running.

Important: Unlike the setup.exe program, the msiexec.exe program does not install any prerequisites. When you use msiexec.exe, you must install all prerequisites manually.

Procedure

To install Microsoft Management Console (MMC), enter each of these **msiexec** commands on a single line from a Run as Administrator command line.

```
msiexec /i "x:\fcm\aaa\mmc\4110\enu\IBM Tivoli Storage FlashCopy Manager.msi"
RebootYesNo="No" Reboot="ReallySuppress" ALLUSERS=1
INSTALLDIR="c:\program files\tivoli" ADDLOCAL="Client"
TRANSFORMS="x:\fcm\aaa\mmc\4110\enu\1033.mst" /qn /l*v "c:\temp\log_fcm.log"
```

where *x:* is your DVD drive and *aaa* is either x86 or x64.

What to do next

Important:
- You must place quotation marks (") around the following items:
  - A directory path that contains spaces.
  - An argument that specifies multiple features. Although you must use quotation marks around the complete argument, you must still place a backslash before each internal quotation mark.
- All features that are listed in a custom installation must be specified after the **addlocal** option.

Upgrading Tivoli Storage FlashCopy Manager

You can upgrade Tivoli Storage FlashCopy Manager with the latest versions of Tivoli Storage FlashCopy Manager for Exchange Server and Tivoli Storage FlashCopy Manager for SQL Server.

Before you begin

- Install Tivoli Storage FlashCopy Manager. When you extract and install the Tivoli Storage FlashCopy Manager `setupFCM.exe` package, ensure that you leave all the source installation binary files on your local system.
- Run the configuration wizard and verify your Tivoli Storage FlashCopy Manager version. The configuration wizard does not run if it cannot locate the installation package binary files on your system.

Procedure

1. Download the latest patch files for Tivoli Storage FlashCopy Manager for Exchange Server or Tivoli Storage FlashCopy Manager for SQL Server at Index of Tivoli Data Protection patches.
2. Extract the patch files that you downloaded, and run `setupFCM.exe`. Ensure that you leave all the source installation binary files on your local system or the configuration wizard might not run.
3. To start Microsoft Management Console (MMC), click **Start** > **All Programs** > **Tivoli FlashCopy Manager** > **FlashCopy Manager Management Console**. The system detects the patch files that you installed for Tivoli Storage FlashCopy Manager for Exchange Server or Tivoli Storage FlashCopy Manager for SQL Server, and identifies the version.
4. In the Welcome page, click **OK**.

   The configuration wizard automatically starts and can vary depending on the software licenses that are found on the system. If the configuration wizard does not start automatically, click **IBM Tivoli Storage Manager** in the tree view, and click **Configuration**. Then, double-click **Wizards**.
5. In the configuration wizard, select to configure either Exchange Server or SQL Server installed components. The configuration wizard guides you through the process of provisioning and installing the remaining files for the selected Data Protection component. When the configuration wizard is complete, the Data Protection component version is displayed.
6. At any stage, rerun the configuration wizard to verify the Data Protection component version that Tivoli Storage FlashCopy Manager is running.

What to do next

After you upgrade Tivoli Storage FlashCopy Manager, you can restore, mount, and unmount any local backups that are created with an earlier version of the software. Use the upgraded version of the software to complete this task. If you use an older version of the software, errors occur.

Tivoli Storage FlashCopy Manager migration

Migration from earlier versions of Tivoli Storage FlashCopy Manager is supported.

After you upgrade to a newer version of Tivoli Storage FlashCopy Manager, use VSS restore for local VSS backups that were originally created with the older version of the software.

If you used a previous version of Tivoli Storage FlashCopy Manager in a Microsoft clustering environment, and you upgrade to a newer version of Tivoli Storage FlashCopy Manager, any existing backups that are completed on cluster disks do not count toward the maximum number of versions. New backups for clustered disks that are completed with the newer version of Tivoli Storage FlashCopy Manager are managed logically for the cluster. Except for the active backup, older backups eventually expire. When you no longer must retain the active backup, the active backup must be deleted by using the **delete backup** command. You can restore the existing backups.

Managing migrated backups to a Database Availability Group node

When you configure Tivoli Storage FlashCopy Manager to back up databases in a DAG to a common DAG node, all DAG databases are backed up with the new DAG node name.

Before you begin

If you are migrating from a version that is earlier than Tivoli Storage FlashCopy Manager V6.4 or Tivoli Storage FlashCopy Manager V3.2, manage the backups from the previous versions by following these guidelines:

- Do not mix backups that are created with previous versions of Tivoli Storage FlashCopy Manager with new backups that are created by using the DAG node. To separate the backups, keep the previous backups under the previous Data Protection node name that is defined in the `dsm.opt` file in the `C:\Program Files\Tivoli\tsm\TDPExchange` directory, and use a new DAG node name to store the new backups.
- To view or restore a backup that is stored under the previous node name, you must change the Tivoli Storage FlashCopy Manager configuration.
- You must manually delete backups over time if the old backups are no longer useful.

Procedure

1. After you complete your migration, ensure that the first backup you do is a full backup.
2. To view and restore backups that are stored under the previous Data Protection node name, complete these steps:
   a. Remove the **DAG Node** by using the General properties page, configuration wizard, or the **set** command on the command line.
   b. Restart or refresh Microsoft Management Console (MMC) or command-line interface.
   c. Click the **Recover** tab in MMC, or run a `tdpexcc query tsm *` command. Because the **DAG Node** parameter is not set, Tivoli Storage FlashCopy Manager lists the backups that are stored under the Tivoli Storage FlashCopy Manager node.

> d. Proceed to restore one or more of the listed backups.
>
> 3. Delete the backups that are expired.

Uninstalling Tivoli Storage FlashCopy Manager

When you install Tivoli Storage FlashCopy Manager, some components are saved to your system. You can remove components by using the Windows **Add or Remove Programs** or **Programs and Features** in the Windows control panel. You must manually remove any remaining files, registry keys, or Windows services that are created by Tivoli Storage FlashCopy Manager.

Before you begin

Log into a Windows account with administrator privileges.

About this task

This procedure assumes that a default Tivoli Storage FlashCopy Manager configuration is in place.

Use this procedure to completely remove all Tivoli Storage FlashCopy Manager data from a computer. Adjust the path in the example to suit your environment.

Procedure

1. Copy any files that you want to keep from the `c:\Program Files\Tivoli` directory and its subdirectories to a different directory. For example, you might have configuration files that you want to save.
2. Delete any Tivoli Storage FlashCopy Manager scheduled tasks:
   a. Select the **Scheduling** node in the Tivoli Storage FlashCopy Manager tree view.
   b. Select each scheduled task that is listed in the Schedules section of the results pane, and click **Delete**.
3. Stop any Tivoli Storage FlashCopy Manager components that are running.
4. Delete any existing Tivoli Storage FlashCopy Manager snapshots by issuing the `DELETE BACKUP` command.
5. Enter the following commands. You can use the command `dsmcutil list` to display any Tivoli Storage FlashCopy Manager services that are installed.
   a. `cd /d "c:\program files\tivoli\tsm\baclient"`

   If necessary, replace `c:\program files\tivoli` with the correct installation folder.
   b. `dsmcutil remove /name:"TSM Remote Client Agent"`

   Important: Remove the TSM Remote Client Agent before you remove the TSM Client Acceptor, or the TSM Client Acceptor cannot be removed.
   c. `dsmcutil remove /name:"TSM Client Acceptor"`
6. From the **Control Panel** window, open **Add or Remove Programs** or **Programs and Features**.
7. Uninstall the following items if listed:
   * IBM Tivoli Storage FlashCopy Manager
   * IBM Tivoli Storage FlashCopy Manager - CHS
   * IBM Tivoli Storage FlashCopy Manager - CHT

- IBM Tivoli Storage FlashCopy Manager - DEU
- IBM Tivoli Storage FlashCopy Manager - ESP
- IBM Tivoli Storage FlashCopy Manager - FRA
- IBM Tivoli Storage FlashCopy Manager - ITA
- IBM Tivoli Storage FlashCopy Manager - JPN
- IBM Tivoli Storage FlashCopy Manager - KOR
- IBM Tivoli Storage FlashCopy Manager - PTB
- IBM Tivoli Storage Manager Client
- IBM Tivoli Storage Manager Client - Chinese (PRC)
- IBM Tivoli Storage Manager Client - Chinese (Taiwan)
- IBM Tivoli Storage Manager Client - French
- IBM Tivoli Storage Manager Client - German
- IBM Tivoli Storage Manager Client - Italian
- IBM Tivoli Storage Manager Client - Japanese
- IBM Tivoli Storage Manager Client - Korean
- IBM Tivoli Storage Manager Client - Portuguese(Brazil)
- IBM Tivoli Storage Manager Client - Spanish
- IBM Tivoli Storage Manager for Databases - MS SQL
- IBM Tivoli Storage Manager for Databases - MS SQL - CHS
- IBM Tivoli Storage Manager for Databases - MS SQL - CHT
- IBM Tivoli Storage Manager for Databases - MS SQL - DEU
- IBM Tivoli Storage Manager for Databases - MS SQL - ESP
- IBM Tivoli Storage Manager for Databases - MS SQL - FRA
- IBM Tivoli Storage Manager for Databases - MS SQL - ITA
- IBM Tivoli Storage Manager for Databases - MS SQL - JPN
- IBM Tivoli Storage Manager for Databases - MS SQL - KOR
- IBM Tivoli Storage Manager for Databases - MS SQL - PTB
- IBM Tivoli Storage Manager for Mail - MS Exchange
- IBM Tivoli Storage Manager for Mail - MS Exchange - CHS
- IBM Tivoli Storage Manager for Mail - MS Exchange - CHT
- IBM Tivoli Storage Manager for Mail - MS Exchange - DEU
- IBM Tivoli Storage Manager for Mail - MS Exchange - ESP
- IBM Tivoli Storage Manager for Mail - MS Exchange - FRA
- IBM Tivoli Storage Manager for Mail - MS Exchange - ITA
- IBM Tivoli Storage Manager for Mail - MS Exchange - JPN
- IBM Tivoli Storage Manager for Mail - MS Exchange - KOR
- IBM Tivoli Storage Manager for Mail - MS Exchange - PTB

8. Find the Tivoli Storage Manager staging files and remove them from the file system. Run the following commands:

- `cd /d "c:\program files\tivoli"`

  If the Tivoli Storage Manager staging files are not in the default locations, manually remove the files. If necessary, replace `c:\program files\tivoli` with the correct installation folder.

- `rd /s flashcopymanager`
- `rd /s tsm`

9. Enter the following command:

```
reg query hklm\software\ibm
```

A list of registry keys are displayed. For example:

```
HKEY_LOCAL_MACHINE\software\ibm\ADSM
HKEY_LOCAL_MACHINE\software\ibm\FlashCopyManager
HKEY_LOCAL_MACHINE\software\ibm\GSK7
KEY_LOCAL_MACHINE\software\ibm\GSK8
```

10. Enter the following commands from a Run as Administrator command prompt window.
    a. Enter this command if you want to completely remove the Tivoli Storage Manager backup-archive client from the system: `reg delete HKLM\SOFTWARE\IBM\ADSM` You can uninstall Tivoli Storage FlashCopy Manager, but continue to use Tivoli Storage Manager backup-archive client.
    b. `reg delete HKLM\SOFTWARE\IBM\FLASHCOPYMANAGER`

11. Before you enter the following commands, verify these requirements:
    - The entries `HKEY_LOCAL_MACHINE\software\ibm\GSK7` and `HKEY_LOCAL_MACHINE\software\ibm\GSK8` were included in the command output that is shown in Step 9.
    - No other applications are using IBM GSKIT.

    If either of the preceding conditions exist, enter the following commands:
    a. `reg delete HKLM\software\ibm\GSK7`
    b. `reg delete HKLM\software\ibm\GSK8`

12. Remove any Tivoli Storage FlashCopy Manager user configuration files by entering the following command. Repeat the command for any user accounts that are configured with Tivoli Storage FlashCopy Manager:
    a. Change to the following directory:

       ```
       cd %userprofile%\appdata\local\microsoft_corporation
       ```

       Add quotation marks around the directory name if the name contains any spaces. For example: `cd /d "%userprofile%\appdata\local\microsoft_corporation"`
    b. Enter this command:

       ```
       dir _fmux*
       ```
    c. Remove each folder that begins with _fmux. Make sure to enclose the folder name in quotation marks (" "). For example:

       ```
       rd /s "_FmUx,_Version=4.1.2.0,_C_Path_rusomschqavk3w2upyovnjyl331z5qn3"
       ```

Chapter 4. Configuring

You can use configuration wizards to configure Tivoli Storage FlashCopy Manager, or you can complete the steps manually. For best results, be guided by the step-by-step instructions in the configuration wizards.

About this task

Tivoli Storage FlashCopy Manager provides the following wizards to guide your configuration tasks:

Standalone configuration wizard
> Use this wizard to configure Tivoli Storage FlashCopy Manager to manage snapshot backups as a stand-alone computer. When you select the Standalone Configuration option, you configure Tivoli Storage FlashCopy Manager to manage snapshots locally, without using a Tivoli Storage Manager server. For stand-alone support, backups are stored locally on the server that is running the backup. The VSS backup is created by using Microsoft Volume Shadow Copy Service. The VSS backup produces an online snapshot (point-in-time consistent copy) of Exchange Server, SQL Server, or custom application and file system data.

Tivoli Storage Manager configuration wizard
> Use this wizard to configure Tivoli Storage FlashCopy Manager to work with Tivoli Storage Manager. This integration provides data protection and centrally managed, policy-based administration.
>
> When you select the TSM Configuration option, Tivoli Storage FlashCopy Manager software protects and manages Exchange Server, SQL Server, or custom application and file system data by storing backups locally or on the Tivoli Storage Manager server. With Tivoli Storage Manager, you can also offload your backups to another computer and to move the data to the Tivoli Storage Manager server.

Mailbox Restore Only configuration wizard
> Use this wizard to configure Tivoli Storage FlashCopy Manager to restore mailboxes from mounted Exchange database EDB files. When you select the Mailbox Restore Only configuration option, extra data protection features are not available. This configuration option is ideal when you want to restore mailboxes from only .EDB files and you do not want to use the additional Tivoli Storage FlashCopy Manager software functions. The functions that are available with this configuration option are included in the other configuration options.

Configuring Tivoli Storage FlashCopy Manager in a stand-alone configuration

By using the Standalone Configuration Wizard, you can configure Tivoli Storage FlashCopy Manager to store database snapshots locally, without using a Tivoli Storage Manager server.

About this task

The configuration procedure applies to the following environments:
* Tivoli Storage FlashCopy Manager for SQL Server, if the required license is located
* Tivoli Storage FlashCopy Manager for Exchange Server, if the required license is located
* File system and custom applications

Procedure

1. To start Microsoft Management Console (MMC), click **Start** > **All Programs** > **Tivoli Storage FlashCopy Manager** > **FlashCopy Manager Management Console**.

   If the Management Console is not configured according to the licenses that are identified, a welcome page is displayed. You can select the type of configuration to complete.

2. From the start page, click **Configuration**. Alternatively, from the tree view, go to the **Configuration** node. Then, double-click **Wizards**.

3. In the results pane, double-click **Standalone Configuration**to open the Standalone Configuration Wizard.

4. Follow the wizard instructions to configure stand-alone snapshot support.

   a. In the Data Protection Selection page, select the applications that you want to protect. You can select the **SQL Server**, **Exchange Server**, or **File System** workload.

   b. To view information about the computer, operating system, processor, and physical memory, click **Show System Information**.

   c. Review the information in the Requirements Check page. Correct any error or warning messages. For Exchange Server workload, if you do not have all the user roles that are required for individual mailbox restore operations, click the **Warnings** link and follow the wizard prompts to add the missing Exchange Server roles. If you are a member of the Exchange Organization Management group and have sufficient Role Based Access Control (RBAC) permissions, you can automatically add the missing roles. If you are not a member of the Exchange Organization Management group and have insufficient RBAC permissions, you must manually add the missing roles.

   d. Select the **Default** configuration setting. When you select the **Default** configuration setting, the VSS Requestor is configured in addition to configuring the applications that you selected. The client and agent services are also registered and configured, and a schedule to support historical managed capacity is defined.

   If you need more than one instance of the Client Acceptor and Remote Agent services, or if you use the backup-archive client to back up to the Tivoli Storage Manager server, but Tivoli Storage FlashCopy Manager is in a stand-alone configuration, click **Custom**. You can use the **Custom** setting to choose a node name for the Client Acceptor and Remote Agent services, an

options file, service names, and the HTTP port. Tivoli Storage FlashCopy Manager does not interfere with the existing client operations. If the backup-archive client is not installed and configured to protect the file system, the **Default** setting is easier to use.

When you select **Custom**, more fields are displayed to change the client service configuration. Review the information in the fields and, if necessary, change settings.

- **VSS Requestor node name**: Enter the node name that communicates with the VSS Service to access the Exchange Server, SQL Server, or custom application and file system data. The VSS Requestor node name is also the node name that the Remote Client Agent service uses to communicate with Tivoli Storage FlashCopy Manager.
- **VSS Requestor options file name**: Enter the name of the client options file for the VSS Requestor node.
- **Client Acceptor service name**: Specify the name of the service that is used by Tivoli Storage Manager backup-archive client to communicate with Tivoli Storage FlashCopy Manager. By default, this service is named the **TSM Client Acceptor**.
- **Remote Client Agent service name**: Specify the name of the service that communicates with Windows VSS to run the VSS operations. By default, this service is named the **TSM Remote Client Agent**.
- **HTTP Port**: Specify the HTTP port to use for the Client Acceptor service.

You can also delete an existing service by selecting a service in the **Currently installed client services** list and clicking **Remove**. Removal of a service happens instantly. The removal occurs when you click **Remove**.

e. Click **Show Details** to view a list of individual configuration results.

5. Click **Finish** to complete the wizard.

6. Optional: After you complete the configuration process with the wizard, test VSS snapshots on the system. Click **Run VSS diagnostics when this wizard exits**.

    Attention: If the configuration is for space-efficient target volumes for SAN Volume Controller or Storwize V7000, testing VSS snapshots deletes previous backups that are created for the volumes that are selected in the test wizard.

7. To verify that Tivoli Storage FlashCopy Manager is correctly configured, select a workload in the **Protect and Recover Data** node in the tree view. From the **Automate** view, issue one of the following commands. . For example, the following CLI commands can be used:

    - For file systems and custom applications:

      ```
      fcmcli query component
      fcmcli query config
      ```

    - For SQL Server:

      ```
      tdpsqlc query tdp
      tdpsqlc query fcm
      tdpsqlc query sql
      ```

    - For Exchange Server:

      ```
      tdpexcc query tdp
      tdpexcc query fcm
      tdpexcc query exchange
      ```

    You can use the selection tool to choose to enter either CLI commands or PowerShell cmdlets. You can also view the configuration settings by clicking **Properties** for each configured workload.

What to do next

After you complete the configuration wizard, you can use Tivoli Storage
FlashCopy Manager to back up and restore data.

Configuring a Tivoli Storage FlashCopy Manager remote system in a stand-alone configuration

By using the Standalone Configuration Wizard, you can configure a remote system
to work in a stand-alone environment.

Before you begin

On the local system, verify the following system requirements:
* Windows 7, Windows 8, Windows 2008, Windows 2008 R2, Windows 2012,
  Windows 2012 R2, or a later version is installed
* PowerShell version 3.0 is installed, if you are running Windows 7, Windows 8,
  Windows 2008, or Windows 2008 R2. With Windows 2012, PowerShell version
  4.0 is installed by default.
* Tivoli Storage FlashCopy Manager version 4.1.1 or a later version is installed

On the remote system, verify the following system requirements:
* Windows 2008, Windows 2008 R2, Windows 2012, Windows 2012 R2, or a later
  version is installed
* Windows PowerShell version 3.0 is installed, if you are running Windows 2008,
  or Windows 2008 R2. With Windows 2012, PowerShell version 4.0 is installed by
  default.
* Tivoli Storage FlashCopy Manager version 4.1.1 or a later version is installed
* The required workload is configured.

Procedure

1. On the local system, start the Tivoli Storage FlashCopy Manager Management
   Console.
2. From the Management Console, use Manage Computers to add the remote
   system.
3. In the navigation tree, verify that the remote system is displayed.
4. Click **Manage** > **Configuration** > **Wizards**.
5. Select **Standalone Configuration**.
6. On the Data Protection Selection page, verify that the following information is
   entered correctly:
   * The remote computer name in the window title.
   * The correct system information.
7. Select the application to be configured and click **Next**.
8. On the Requirements Check page, click **Show Details**. For Exchange Server
   workload, if you do not have all the user roles that are required for individual
   mailbox restore operations, click the **Warnings** link and follow the wizard
   prompts to add the missing Exchange Server roles. If you are a member of the
   Exchange Organization Management group and have sufficient role-based
   access control (RBAC) permissions, you can automatically add the missing
   roles. If you are not a member of the Exchange Organization Management
   group and have insufficient RBAC permissions, you must manually add the
   missing roles.

9. On the Custom Configuration page, select **Default**.
10. On the Configuration page, click **Show Details**. Verify the progress and status of the configuration.
11. Click **Finish** to complete the wizard.

What to do next

To verify that the configuration is set up correctly, complete the following steps:

1. In the navigation tree, for the remote system, expand **Protect and Recover** and click the application that is configured.
2. Query the components and verify that a successful backup can be completed.

Related concepts:

"Security requirements for Microsoft Exchange Server data" on page 18

Configuring Tivoli Storage FlashCopy Manager to integrate with Tivoli Storage Manager

By using the TSM Configuration Wizard, you can configure Tivoli Storage FlashCopy Manager to protect and manage Exchange Server, SQL Server, or custom application and file system data by storing backups locally or on the Tivoli Storage Manager server.

Before you begin

If you configure the DSM Agent node (the backup-archive client node) manually, ensure that you set the **PASSWORDAccess** option to **generate** in the `dsm.opt` file for the Tivoli Storage Manager backup-archive client. Also ensure that the stored password for the DSMAGENT Node is valid.

About this task

The configuration procedure applies to the following environments:

- Tivoli Storage FlashCopy Manager for SQL Server, if the required license is located
- Tivoli Storage FlashCopy Manager for Exchange Server, if the required license is located
- File system and custom applications

Procedure

1. To start Microsoft Management Console (MMC), click **Start** > **All Programs** > **Tivoli Storage FlashCopy Manager** > **FlashCopy Manager Management Console**.

   If MMC is not configured for licenses that are identified, a welcome page is displayed. You can select the type of configuration to complete.
2. From the start page, click **Configuration**. Alternatively, from the tree view, go to the **Configuration** node. Then, double-click **Wizards**.
3. In the results pane, double-click **TSM Configuration** to open the Tivoli Storage Manager Configuration Wizard.
4. Follow the wizard configuration instructions, and click **Next** to move to the next page.

a. In the Data Protection Selection page, select the applications that you want to protect. You can select the **SQL Server**, **Exchange Server**, or **File System** workload.

b. Review the results of the requirements check and ensure that you address any errors or warnings.

   Click **Show Details** to view results.

   - If you are configuring an application for which you do not have the necessary license, the license requirement check fails. You must either return to the Data Protection Selection page and clear the selected application to proceed with the configuration, or obtain the necessary license.

   - For Exchange Server workload, if you do not have all the user roles that are required for individual mailbox restore operations, click the **Warnings** link and follow the wizard prompts to add the missing Exchange Server roles. If you are a member of the Exchange Organization Management group and have sufficient role-based access control (RBAC) permissions, you can automatically add the missing roles. If you are not a member of the Exchange Organization Management group and have insufficient RBAC permissions, you must manually add the missing roles.

c. In the TSM Node Names page, specify the Tivoli Storage Manager node names, which exist on the same system, to use for the applications that you want to protect.

Table 4. Field entry in the Tivoli Storage Manager Node Names page

Field	Action
VSS Requestor	Enter the node name that communicates with the VSS service to access the Exchange Server, SQL Server, or custom application and file system data.
Data Protection for SQL	Enter the node name where the Data Protection application is installed. This name is the node name that is used to store the Tivoli Storage FlashCopy Manager for SQL Server backups. **Tip:** If you do not need a VSS configuration for your SQL Server, you can skip the configuration. Click **Do not configure DP SQL VSS support**.
AlwaysOn Node	Enter a node name if you are configuring Tivoli Storage FlashCopy Manager with SQL Server 2012 and later versions. This name is the node name that is used to back up the availability databases in an AlwaysOn Availability Group. By default, the Windows Failover Cluster name is used.
Data Center Node	Enter the data center node name if the Tivoli Storage Manager for Virtual Environments Recovery Agent license is available. The data center node is the virtual node that maps to a data center.

Field	Action
Data Protection for Exchange	Enter the node name where the Data Protection application is installed. This name is the node name that is used to store the Tivoli Storage FlashCopy Manager for Exchange Server backups. If you configure the **DAG Node** on this wizard page, Exchange Server DAG database backups are not stored under the Data Protection for Exchange Server node. They are stored under the DAG node.
DAG Node	Enter the node name that you want to use to back up databases in an Exchange Server DAG. With this setting, backups from all DAG members that are configured to use the DAG node are backed up to a common file space on the Tivoli Storage Manager server. The database copies are managed as a single entity, regardless of which DAG member they were backed up from. This setting can prevent Tivoli Storage FlashCopy Manager from making too many backups of the same database. Ensure that you configure all of your DAG members that have copies of the same database to all use the same DAG node. On the Tivoli Storage Manager server, ensure that you register the DAG node name. All of the DAG member nodes (the Data Protection nodes) must be granted *proxynode* authority to run backups on behalf of the DAG node. All of the DSM Agent nodes (the backup-archive client nodes) must also be granted *proxynode* authority. If you do not want to manually update these properties, you can use the configuration wizard to set the properties on the Tivoli Storage Manager server.
Files System and Custom Configuration	Enter the node name that you want to use to back up custom application and file system data.

Create a node name that can help you distinguish the type of backup that is run. For example, if your host name is *MALTA*, you can name the VSS Requestor node name `MALTA`, and you can create a Data Protection node name that is called `MALTA_EXC`. For an SQL Server configuration, the AlwaysOn node name does not have to be related to the VSS Requestor or the Tivoli Storage FlashCopy Manager for SQL Server node name. For example, you can name it `TSM_ALWAYSON`. For an Exchange Server configuration, the DAG node name does not have to be related to the VSS Requestor or the Tivoli Storage FlashCopy Manager for Exchange Server node name. For example, you can name it `TSMDAG`.

d. Enter information for the Tivoli Storage Manager server that you are connecting to and click **Next** to continue.

Table 5. Field entry in the Tivoli Storage Manager Node Names page

Field	Action
Tivoli Storage Manager Server Address	Enter the TCP/IP domain name or a numeric IP address for the Tivoli Storage Manager server that contains the backups. Obtain this information from your Tivoli Storage Manager server administrator.
Tivoli Storage Manager Server Port	Enter the port number for the Tivoli Storage Manager server that contains the backups. Obtain this information from yourTivoli Storage Manager administrator.

Specify whether to have the wizard to configure the Tivoli Storage Manager server for you by generating a configuration macro file.

If you click **No**, the macro file is available at the final page of the wizard so that it can be provided to the Tivoli Storage Manager administrator as an example of one way to configure the Tivoli Storage Manager server to support application data protection.

If you click **Yes**, the wizard starts the macro during the Configuration step in the wizard. Review the macro file and update it if needed.

After you click **Yes**, enter the following information in the appropriate field:

*
  – The name of the Tivoli Storage Manager administrator account.
  – The password for the Tivoli Storage Manager administrator.
  – Click **Test Communications** if you want to test your connection with the Tivoli Storage Manager server. This option is not available until the VSS Requestor is installed.
  – Click **Review/Edit** to review or update the Tivoli Storage Manager macro file. Alternatively, you can review the macro file and directly run the commands on the Tivoli Storage Manager server.

e. Select the **Default** configuration setting. When you select the **Default** configuration setting, the VSS Requestor is configured in addition to configuring the applications that you selected. The client and agent services are also registered and configured, and a schedule to support historical managed capacity is defined.

f. Review the results of the configuration process. Click **Show Details** to view a list of individual configuration results.

5. Click **Finish** to complete the wizard.

6. Optional: After you complete the configuration process with the wizard, test VSS snapshots on the system. Click **Run VSS diagnostics when this wizard exits**.

   Attention: If the configuration is for space-efficient target volumes for SAN Volume Controller or Storwize V7000, testing VSS snapshots deletes previous backups that are created for the volumes that are selected in the test wizard.

7. To verify that Tivoli Storage FlashCopy Manager is correctly configured, select a workload in the **Protect and Recover Data** node in the tree view. From the **Automate** view, issue one of the following commands.

- For file systems and custom applications:

```
fcmcli query component
fcmcli query config
```

- For SQL Server:

```
tdpsqlc query tdp
tdpsqlc query tsm
tdpsqlc query sql
```

- For Exchange Server:

```
tdpexcc query tdp
tdpexcc query tsm
tdpexcc query exchange
```

You can use the selection tool to choose to enter either CLI commands or PowerShell cmdlets. You can also view the configuration settings by clicking **Properties** for each configured workload.

What to do next

After you complete the configuration wizard, you can use Tivoli Storage FlashCopy Manager to back up and restore data.

Configuring a Tivoli Storage FlashCopy Manager remote system to integrate with Tivoli Storage Manager

By using the TSM Configuration Wizard, you can configure a remote system to communicate with a Tivoli Storage Manager server.

Before you begin

On the local system, verify the following system requirements:
- Windows 7, Windows 8, Windows 2008, Windows 2008 R2, Windows 2012, Windows 2012 R2, or a later version is installed
- PowerShell version 3.0 is installed, if you are running Windows 7, Windows 8, Windows 2008, or Windows 2008 R2. With Windows 2012, PowerShell version 4.0 is installed by default.
- Tivoli Storage FlashCopy Manager version 4.1.1 or a later version is installed

On the remote system, verify the following system requirements:
- Windows 2008, Windows 2008 R2, Windows 2012, Windows 2012 R2, or a later version is installed
- Windows PowerShell version 3.0 is installed, if you are running Windows 2008, or Windows 2008 R2. With Windows 2012, PowerShell version 4.0 is installed by default.
- Tivoli Storage FlashCopy Manager version 4.1.1 or a later version is installed
- The required workload is configured.

Procedure

1. On the local system, start Microsoft Management Console (MMC).
2. From MMC, use Manage Computers to add the remote system.
3. In the navigation tree, verify that the remote system is displayed.
4. Click **Manage** > **Configuration** > **Wizards**.
5. Select **TSM Configuration**.

6. On the Data Protection Selection page, verify that the following information is entered correctly:
   - The remote computer name in the window title.
   - The correct system information.
7. Select the application to be configured and click **Next**.
8. For Exchange or SQL Server, the license check might fail. If the test fails, provide the file path and name for the location on the remote server.
9. On the TSM Node Names page, verify that the following information is entered correctly:
   - VSS Requestor
   - The Data Protection or file system name, depending on the application that is configured

   For systems with a Database Availability Group (DAG) or an AlwaysOn Availability Group, the corresponding DAG node or AlwaysOn node is detected.
10. On the TSM Server Settings page, type the server name and port number.
11. For the **Would you like this wizard to configure your TSM server?** question, select **Yes**.
12. Click **Review / Edit**. If the domain is not entered correctly, update the information. Click **OK**.
13. On the Custom Configuration page, select **Default**.
14. On the Configuration page, click **Show Details**. Verify the progress and status of the configuration.
15. Click **Finish** to complete the wizard.

What to do next

To verify that the configuration is set up correctly, complete the following steps:
1. In the navigation tree, for the remote system, expand **Protect and Recover** and click the application that is configured.
2. Open the Properties and click **Server Information**. Verify that the correct information is displayed.
3. Query the components and verify that a successful backup can be completed.

Related concepts:

"Security requirements for Microsoft Exchange Server data" on page 18

Configuring Tivoli Storage FlashCopy Manager to restore mailboxes from mounted Exchange Server database files

The Mailbox Restore Only configuration wizard is useful when you do not have to configure additional Tivoli Storage FlashCopy Manager software functions.

Procedure

1. To start Microsoft Management Console (MMC), click **Start** > **All Programs** > **Tivoli Storage FlashCopy Manager** > **FlashCopy Manager Management Console**.
2. From the start page, click **Configuration**. Alternatively, from the tree view, go to the **Configuration** node. Then, double-click **Wizards**.
3. In the results pane, double-click **Mailbox Restore Only** to open the Mailbox Restore Only Configuration wizard.

4. Follow the wizard configuration instructions. Click **Show Details** to view a list of individual requirement results.

   Review the results of the requirements check and address any errors or warnings. For Exchange Server workload, if you do not have all the user roles that are required for individual mailbox restore operations, click the **Warnings** link and follow the wizard prompts to add the missing Exchange Server roles. If you are a member of the Exchange Organization Management group and have sufficient Role Based Access Control (RBAC) permissions, you can automatically add the missing roles. If you are not a member of the Exchange Organization Management group and have insufficient RBAC permissions, you must manually add the missing roles.
5. Click **Finish** to complete the wizard.

Related concepts:

"Security requirements for Microsoft Exchange Server data" on page 18

Configuring node definitions for Tivoli Storage FlashCopy Manager

Although Tivoli Storage FlashCopy Manager can automatically configure node definitions, you can also manually configure node names for Tivoli Storage FlashCopy Manager. You can also configure the system that runs offloaded backups.

Proxy node definitions for VSS backups

You must use node names for VSS operations because FlashCopy Manager for Microsoft Exchange Server and FlashCopy Manager for Microsoft SQL Server use the Tivoli Storage Manager backup-archive client to implement VSS backup operations.

In addition, you must use a node name for where FlashCopy Manager for Microsoft Exchange Server or FlashCopy Manager for Microsoft SQL Server is installed.

As part of the configuration procedure, a proxy relationship is defined for these node names. By default, this proxy relationship is defined when you run the configuration wizard. You can manually complete the configuration.

The proxy relationship allows node names to process operations on behalf of another node name. When you register these nodes to the Tivoli Storage Manager server for VSS operations, do not specify the Tivoli Storage Manager USerid=NONE parameter. VSS operations fail when this parameter is specified.

Two types of node names are defined in proxy node relationships:
- *Target node*: A node name that controls data backup and restore operations and also owns the data on the Tivoli Storage Manager server. This node name is specified in the FlashCopy Manager for Microsoft Exchange Server and FlashCopy Manager for Microsoft SQL Server dsm.opt file.
- *Agent node*: A node name that processes operations on behalf of a target node. This node name is specified in the backup-archive client dsm.opt file.

To define these nodes, enter the backup-archive client **grant proxy** command. For example:

```
GRANT PROXY TARGET= AGENT=dsmagent_node_name
```

Required node names for basic VSS operations

VSS operations require specific node name settings.

To process basic VSS operations, you must have one target node and one agent node.

Table 6. Required node names for basic VSS operations

Proxy node type	Node name	Where to specify
Target node	The FlashCopy Manager for Microsoft Exchange Serveror FlashCopy Manager for Microsoft SQL Server node name.	Use the nodename option in the options file (dsm.opt)
Agent node	The Local DSMAGENT Node name. This name must match the backup-archive client node name.	Use the **localdsmagentnode** parameter in the configuration file

Note: For basic VSS operations, the agent node and target node are on the same system.

Required node names for basic VSS offloaded backups

VSS offloaded backups require specific node name settings.

To complete VSS offloaded backups, you must have one target node and two agent nodes:

Table 7. Required node names for basic VSS offloaded backups

Proxy node type	Node name	Where to specify
Target node	FlashCopy Manager for Microsoft Exchange ServerFlashCopy Manager for Microsoft SQL Server node name	Use the **nodename** option in the options file (dsm.opt)
Agent node	Local DSMAGENT Node	Use the **localdsmagentnode** parameter in the configuration file
Agent node	Remote DSMAGENT Node	Use the **remotedsmagentnode** parameter in the configuration file

Target node
> This node name is where FlashCopy Manager for Microsoft Exchange Server or FlashCopy Manager for Microsoft SQL Server is installed. This node name (specified with the **nodename** option in the dsm.opt file) is referred to as the FlashCopy Manager for Microsoft Exchange Server or FlashCopy Manager for Microsoft SQL Server node name.

Agent node - Local DSMAGENT Node
> This node name is where the backup-archive client and VSS provider are installed. This node is responsible for processing the VSS operations because FlashCopy Manager for Microsoft Exchange Server does not process any direct VSS operations.
>
> This node name is referred to as the Local DSMAGENT Node and is specified with the **localdsmagentnode** parameter in the FlashCopy Manager for Microsoft Exchange Server or FlashCopy Manager for Microsoft SQL

Server configuration file (by default). To use the Properties window of Microsoft Management Console (MMC), select VSS backup. In the Properties window, you can update the Local DSMAGENT Node name. Otherwise, use the command to specify this parameter.

Agent node - Remote DSMAGENT Node

This node name is a separate system that must also have the backup-archive client, and the VSS provider installed. In addition, for Exchange Server workloads, ensure that you install the same level of the Exchange System Management Tools that is installed on your Exchange production server. This node is responsible for moving VSS snapshot data from local shadow volumes to the Tivoli Storage Manager server.

This node name is referred to as the Remote DSMAGENT Node and is specified with the `remotedsmagentnode` parameter in the FlashCopy Manager for Microsoft Exchange Serveror FlashCopy Manager for Microsoft SQL Server configuration file (by default). To use the Properties window of MMC, select VSS backup. Then, you can update the Remote DSMAGENT Node name. Otherwise, use the command to specify this parameter.

The choice of available systems depends on whether the systems have access to the local shadow volumes that contain the VSS snapshot backups. This node name is only valid for VSS environments that support shadow copies that can be transported.

It is not supported if you are using the default VSS system provider.

Ensure that the `localdsmagentnode` and `remotedsmagentnode` are registered to the same Tivoli Storage Manager server that is specified in the FlashCopy Manager for Microsoft Exchange Server or FlashCopy Manager for Microsoft SQL Server options file (`dsm.opt`) and the backup-archive client options file (also `dsm.opt`).

Configuring the system that runs offloaded backups

Complete the following steps on the computer that is running the offloaded backups. This task is for VSS operations only.

Procedure

1. Configure the Tivoli Storage Manager backup-archive client if it is not already configured. If the backup-archive client is already configured, you can use existing client services. Select **Utilities** > **Setup Wizard** > **Help me configure the TSM Backup Archive Client**.

   The node name for this system is called the Remote DSMAGENT Node and is specified with the `remotedsmagentnode` parameter in the FlashCopy Manager for Microsoft Exchange Server or FlashCopy Manager for Microsoft SQL Server configuration file on the local system.

2. Install and configure the Tivoli Storage Manager Client Acceptor (CAD) Service and the Remote Client Agent Service (DSMAGENT) if these services are not already installed. If a client CAD Service is already installed and configured, you can use an existing one. Use the backup-archive client Setup wizard to guide you through the CAD installation process by selecting **Utilities** > **Setup Wizard** > **Help me configure the TSM Web Client**.

3. Install and configure a VSS provider if you do not use the default system VSS provider. Consult the VSS provider documentation for information about the configuration of that software.

Configuring Tivoli Storage FlashCopy Manager to protect SQL Server data

With Tivoli Storage FlashCopy Manager for SQL Server, you can configure SQL Server clustered environments, high availability environments, and Windows Server Core environments.

Configuring Tivoli Storage FlashCopy Manager for SQL Server clustered environments

Depending on the applications that are installed, you can configure Tivoli Storage FlashCopy Manager to operate in clustered environments with SQL Server, or file system workloads.

Related tasks:

"Troubleshooting configuration errors in a failover clustered environment" on page 227

Configuring a Tivoli Storage FlashCopy Manager for SQL Server stand-alone configuration in a SQL Failover Cluster environment with shared disks or cluster shared volumes

You can configure Tivoli Storage FlashCopy Manager as a stand-alone configuration, and protect SQL Server workloads in a clustered environment that uses either shared disks or cluster shared volumes (CSV).

About this task

In the backup-archive client `dsm.opt` file, each system uses its node name as the local agent node for Tivoli Storage FlashCopy Manager. The same Data Protection for SQL node name, `VirtualClusterNodeName`, is applied to all of the systems in the cluster.

The `VSSALTSTAGINGDIR` path must point to an accessible directory on a shared disk, for example, `X:\vss_staging`, or to a cluster shared volume, for example, `C:\ClusterStorage\Volume1\vss_staging`. The `VSSALTSTAGINGDIR` option must be specified in the backup-archive client options file, `baclient\dsm.opt`, and in the Data Protection for SQL options file, `tdpsql\dsm.opt`, and the option argument must be the same. For example, `X:\vss_staging` is the absolute path to the VSS staging directory on a shared disk or a CSV that all cluster nodes can access.

Alternatively, you can go to the `baclient` directory and open either the `dsm.opt` or `custom.opt` file when the configuration wizard mode is in either default or custom mode. By default, the VSS Requestor `dsm.opt` file is in the Tivoli Storage Manager backup-archive client installation directory, `c:\Program Files\tivoli\tsm\baclient\dsm.opt`. The location of the Data Protection for SQL options file is `c:\Program Files\tivoli\tsm\TDPSQL\dsm.opt`.

Procedure

1. Install Tivoli Storage FlashCopy Manager for SQL on all cluster nodes, and in the same directory on all cluster nodes. The default installation directory is `c:\Program Files\Tivoli\FlashCopyManager\`.

2. From Microsoft Management Console (MMC), run the stand-alone configuration wizard and follow these steps:

    a. Specify the same Tivoli Storage Manager node name for the Data Protection for SQL Server configuration.

b. Specify the same folder location for the VSS alternative staging directory to point to an existing directory on a shared disk, or on a cluster shared volume, for example, X:\vss_staging.

You can use the remote management configuration feature for remote management of other cluster nodes.

3. After the configuration wizard finishes successfully, close MMC.

4. Configure the client acceptor daemon. For more information, see Configuring cluster protection (Windows Server clients) (http://www.ibm.com/support/knowledgecenter/SSGSG7_7.1.2/com.ibm.itsm.client.doc/t_cfg_clus_wizard_win2008.html)

5. Repeat these steps on the other nodes in the cluster.

6. Verify that the configuration is valid by manually checking every cluster node as follows:

   a. Open MMC and select **Dashboard** > **Configuration** > **Files**.

   b. Depending on whether the configuration wizard mode is in either default or custom mode, browse to either the `dsm.opt` or `custom.opt` file. Ensure that the settings in the file are as follows:

   ```
   NODename localdsmagent
   PASSWORDAccess generate
   TCPServeraddress flashcopymanager
   CLUSTERnode no
   CLUSTERDISKSOnly no
   VSSALTSTAGINGDIR X:\vss_staging
   ```

   c. Select `dsm.opt` under the Data Protection for SQL section, and ensure that the settings are as follows:

   ```
   NODename VirtualClusterNodeName
   PASSWORDAccess generate
   TCPServeraddress flashcopymanager
   CLUSTERnode yes
   VSSALTSTAGINGDIR X:\vss_staging
   ```

Related tasks:

"Troubleshooting configuration errors in a failover clustered environment" on page 227

Configuring Tivoli Storage FlashCopy Manager for file system and custom applications in a Microsoft Cluster Server environment

You can configure a Tivoli Storage FlashCopy Manager to support a file system and custom application workload in a Microsoft Cluster Server environment.

Before you begin

- Before you begin your configuration, read the entire procedure.
- Perform the configuration steps in the same way on all of the nodes in the cluster.
- Keep the number of cluster groups to a minimum. If possible, have only one cluster resource group that contains all physical disk resources.
- Use a dedicated volume (VSS staging directory volume) for each cluster resource group. The VSS staging directory volume must have a minimum of 1 GB of storage space for FlashCopy Manager metadata. This volume must be part of the cluster resource group and must be able to fail over with the cluster resource group. This VSS staging directory volume must not be one of the volumes that is backed up with Tivoli Storage FlashCopy Manager.

About this task

Complete the following steps for each node on the cluster.

Procedure

1. Install Tivoli Storage FlashCopy Manager.
2. Start Microsoft Management Console (MMC).

   You are automatically prompted to run the configuration wizard. If the configuration wizard prompt is not displayed automatically, expand the following tree nodes: **IBM Tivoli Storage Manager** > **Dashboard** > **Manage** > **Configuration**. Then, select **Wizards**. Depending on your environment, launch either the Standalone Configuration or TSM Configuration wizard. If you have a Tivoli Storage Manager server, select TSM Configuration, otherwise, if you do not have access to a Tivoli Storage Manager server, select Standalone Configuration.
3. Select the **File System** checkbox. To start the wizard, click **Next**.

Table 8. Configuration options for file system and custom applications

Configuration	Action
Standalone Configuration	1. On the requirements check pane, you might see a **Warnings** link next to the Cluster check rule. Click **Warnings** and MMC displays the Issue Resolution Windows for **vssaltstagingdir** path. In the **Path** field, enter the path of your VSS staging directory volume. If you are configuring multiple resource groups, start with the dedicated volume that belongs to the cluster resource group that you want to configure first.
	2. Complete the wizard pages.
	3. Click **Finish** to complete the initial configuration.
	4. Exit MMC.
	After the configuration wizard completes, the following are the contents of the different options files. Values might differ slightly:
	• In the backup-archive client options file:
	``` NODename OTHELLO PASSWORDAccess generate TCPServeraddress flashcopymanager HTTPport 1581 CLUSTERnode no CLUSTERDISKSOnly no VSSALTSTAGINGDIR J:\vssaltstagingdir ```
	• In the Tivoli Storage FlashCopy Manager file system options file:
	``` NODename OTHELLO_FS PASSWORDAccess generate TCPServeraddress flashcopymanager HTTPport 1581 CLUSTERnode yes VSSALTSTAGINGDIR J:\vssaltstagingdir ```

Table 8. Configuration options for file system and custom applications (continued)

Configuration	Action
TSM Configuration	1. On the requirements check pane, you might see a **Warnings** link next to the Cluster check rule. Click **Warnings** and MMC displays the Issue Resolution Windows for **vssaltstagingdir** path. In this **Path** field, enter the path of your VSS staging directory volume. If you are configuring multiple resource groups, start with the dedicated volume that belongs to the cluster resource group you want to configure first.
	2. Complete the wizard pages.
	3. Click **Finish** to complete the initial configuration. After the configuration wizard is complete, the following contents are displayed in the different options files. Values might differ slightly. In the following OPT files, ensure that the DSM agent node and Tivoli Storage FlashCopy Manager node are registered and granted proxy.
	• In the backup-archive client options file:

	<pre>NODename OTHELLO
	PASSWORDAccess generate
	TCPServeraddress orion.storage.usca.ibm.com
	TCPPort 1500
	CLUSTERnode no
	CLUSTERDISKSOnly no</pre>

	• In the Tivoli Storage FlashCopy Manager file system options file:

	<pre>NODename CLUSTER_FS
	PASSWORDAccess generate
	TCPServeraddress orion.storage.usca.ibm.com
	TCPPort 1500
	HTTPport 1581
	CLUSTERnode yes
	VSSALTSTAGINGDIR J:\vssaltstagingdir</pre>

	4. Exit MMC.
	5. Open a Windows command line and change the directory to the backup-archive client directory location. Default location: c:\Program Files\Tivoli\tsm\baclient
	6. To connect to the Tivoli Storage Manager server, enter the **dsmc** command . You might need to provide your user ID and password for the backup-archive client DSMAGENT node to save the password on the registry. Exit the **dsmc**.
	7. Using the same Windows command line, enter the following command to connect to the Tivoli Storage Manager server by using the Tivoli Storage FlashCopy Manager node:

	<pre>dsmc -optfile="c:\Program Files\Tivoli\FlashCopyManager\
	dsm.opt"</pre>

	You might need to provide your user ID and password for the Tivoli Storage FlashCopy Manager node to save the password on the registry. Exit the **dsmc** and exit the Windows command line.

4. (Standalone Configuration only) Complete the following steps:

   a. Open the Windows Services MMC. Stop both the CAD and Agent Services that are named, by default, *TSM Client Acceptor* and *TSM Remote Client Agent*.

   b. Open a Windows command line and change directories to the Tivoli Storage FlashCopy Manager installation directory. The default location: `C:\Program Files\Tivoli\FlashCopyManager`

   c. Open the `dsm.opt` file by using Notepad, and change the `nodename` option to a different name that would best describe your cluster. For example: `NODEname cluster_fs`

   d. Specify the VSS staging directory volume for Tivoli Storage FlashCopy Manager VSS metadata. Add the **vssaltstagingdir** *path* option at the end of the file. The path must be the path of your VSS staging directory volume.

If you are configuring multiple resource groups, start with the dedicated volume in the cluster resource group that you want to configure first. For example, if the J: drive is the dedicated VSS staging directory volume in the cluster resource that you want to configure, specify this option:

```
VSSALTSTAGINGDIR J:\vssaltstagingdir
```

e. Save and close the Tivoli Storage FlashCopy Manager options file.

f. Change the directory to the backup-archive client installation directory. Default location: `C:\Program Files\Tivoli\tsm\baclient`

g. Open the `dsm.opt` file by using Notepad, and add the exact same value for the **vssaltstagingdir** option as exists in the Tivoli Storage FlashCopy Manager `dsm.opt` file. For example:

```
VSSALTSTAGINGDIR J:\vssaltstagingdir
```

h. Save and close the backup-archive client options file.

i. Exit the Windows command line.

5. If this node is the first cluster node that you are configuring, open the Microsoft Failover Cluster Manager. Go to the cluster resource group that you are configuring. Right-click the resource group and select **Add a resource** > **Generic Service**. From the New Resource Wizard dialog that is displayed, select the CAD service that is named, by default, *TSM Client Acceptor*, and complete the wizard configuration. From the Failover Cluster Manager, bring the *TSM Client Acceptor* service resource online. If you are repeating this procedure for another cluster node, the *TSM Client Acceptor* service resource is already configured. In this scenario, go to the resource group and open the service resource online.

6. Open a Windows command line and change directories to the Tivoli Storage FlashCopy Manager installation directory. Default location: `C:\Program Files\Tivoli\FlashCopyManager`

Enter the following command:

```
fcmcli query component
```

A list of all available volumes for backup is displayed. Your first group resource is configured.

7. Complete the same procedure on the other nodes in your cluster. Before you begin the procedure on other nodes in the cluster, go to the Windows Services MMC, and stop the *TSM Remote Client Agent* service if it is running. Then, using the Microsoft Failover Cluster Manager, make the *TSM Client Acceptor* service offline from the resource group that you configured. Finally move the group resource that you configured to the other node in the cluster and restart the procedure. A final note: All nodes in the cluster must have identical Tivoli Storage FlashCopy Manager options file. For the backup-archive client `dsm.opt` file, each node in the cluster can use its own node name, but everything else in the options file must be identical.

Related concepts:

"Protection of custom application and file system data" on page 37

Moving standard SQL databases to the AlwaysOn node

You can specify the **/USEALWAYSONnode** parameter with the **backup** command to back up standard SQL databases to the file space for the AlwaysOn node. This transition can make it easier for you to manage all your database backups under a single node name.

About this task

If you want to regularly back up standard SQL databases to the file space for the AlwaysOn node, you can use the **set** command.

The AlwaysOn node name is required when you configure Tivoli Storage FlashCopy Manager with SQL Server 2012 and later versions. It is not necessary to specify the AlwaysOn node name during each backup, query, or restore operation of an availability database.

The AlwaysOn node does not affect where standard databases are backed up. The standard databases continue to be backed up to the Tivoli Storage FlashCopy Manager node unless the **/USEALWAYSONnode** option is specified.

Procedure

Enter the following command to back up your standard SQL databases to the file space for the AlwaysOn node:
For example,

```
TDPSQLC Backup *|dbname[,dbname,...] Full /USEALWAYSONnode
```

You can use the wildcard character (*) to back up all databases, or specify a list of database names that are separated by commas.
For example:

```
TDPSQLC Backup standard_db01,standard_db02 Full /USEALWAYSONnode
```

Configuring availability replicas to run scheduled data backups

When an availability database is replicated across multiple availability replicas in an availability group, a configuration option is available to enable you to select a single replica on which to run a backup operation instead of backing up all replicas.

About this task

Microsoft SQL Server 2012 and later versions provide a set of configuration options that you can use to specify whether scheduled backups are run on the primary or secondary availability replica. You can use the Tivoli Storage FlashCopy Manager GUI to set these options.

The configuration option can also be used to offload the backup from a primary replica to a secondary replica for load balancing. When databases fail over, backups must continue to run from other replicas to ensure that high availability is maintained.

Procedure

1. Start Microsoft Management Console (MMC).
2. In the Management section of the window, click **Protect Data** next to the SQL Server workload.
3. In the Action pane, click **Properties**.

4. Click the **AlwaysOn Preferences** property page.

5. In the **Availability group** field, select the **AlwaysOn Availability Group** for which you want to set up backup preferences.

6. In the **Preferred replica** field, select which replica is the preferred replica on which to run scheduled backups.

   - Select **Prefer Secondary replica** if you want scheduled backups to occur on a secondary replica, if it is available. Otherwise, use the primary replica for the scheduled backup.

   - Select **Secondary only** if you want scheduled backups to occur only on a secondary replica.

   - Select **Primary** if you want scheduled backups to occur only on the primary replica.

   - Select **Any replica** if you want scheduled backups to occur on any availability replica.

7. For each availability replica that is listed in the Availability replicas list box, specify whether it is a candidate for running scheduled backups by specifying the backup priority for that replica. A value of 1 has the lowest priority, and a value of 100 has the highest priority. A value of 0 indicates that the replica is excluded from schedule backup operations.

8. Click **OK** to save your configuration and exit the Data Protection Properties page. The settings are saved to the `tdpsql.cfg` file and can be replicated to the other replicas in the availability group.

What to do next

After you configure where scheduled backups are run, the administrator can specify the **tdpsql backup** command along with the **/ALWAYSONPriority** parameter in a backup schedule. For example:

```
tdpsqlc backup TestDb1 full /ALWAYSONPriority
```

When this scheduled backup command is run, Tivoli Storage FlashCopy Manager queries the SQL Server to determine the highest-priority availability replica that is active or online, ordered by preference. If the replica meets the specified criteria, the replica is backed up. Otherwise, the backup operation ends and a message is added to the log to indicate why the replica was not backed up.

An administrator can create a common backup schedule to run on all availability replicas. When the backup schedule starts, each **tdpsqlc** command queries each replica to determine whether it is to run the backup. Only one of the scheduled backups runs the backup.

Configuring Tivoli Storage FlashCopy Manager for SQL Server on Windows Server Core

You can manually configure Tivoli Storage FlashCopy Manager to protect your SQL Server 2012 and later versions on Windows Server Core.

Before you begin

Add the remote server core system to Microsoft Management Console (MMC) assuming that Tivoli Storage FlashCopy Manager is already installed on the remote system and you configured PowerShell remoting on the remote system, on either a local or centralized computer. On the local system that runs MMC, point to the

server core system and complete the TSM Configuration wizard. By using the wizard, you can provision and configure the software as if the wizard is running on the remote system.

If you do not use the remote configuration option, ensure that you install Tivoli Storage FlashCopy Manager and the Tivoli Storage Manager backup-archive client on the system that runs the Microsoft SQL Server.

Procedure

1. Create a node on the Tivoli Storage Manager server for the backup-archive client and Tivoli Storage FlashCopy Manager. If you are protecting availability databases in an AlwaysOn Availability Group, you must also create the AlwaysOn node on the Tivoli Storage Manager server.
2. If you intend to run offloaded VSS backups, set up a remote node to run the offloaded backup operation on a remote computer.
3. Configure the backup-archive client options file (`dsm.opt`).
4. Configure the Tivoli Storage FlashCopy Manager option files (`dsm.opt` and `tsmfcm.cfg`).
5. If you use Tivoli Storage Manager policy sets, specify a management class to use for your Tivoli Storage FlashCopy Manager backups.

Creating a node on the Tivoli Storage Manager server

After you install the Tivoli Storage Manager client and Tivoli Storage FlashCopy Manager, you must set up a node name and password and register your node with the Tivoli Storage Manager server.

About this task

When you register your node, you create a file space on the Tivoli Storage Manager server where the backups of your data are stored. You must set up a client node and a Tivoli Storage FlashCopy Manager node. If you are protecting availability databases in an AlwaysOn Availability Group, you must also register the AlwaysOn node.

Follow these procedures if you installed the Tivoli Storage Manager administrative command line client. If you did not install the administrative client, the nodes must be registered on the Tivoli Storage Manager server.

Procedure

1. Start an administrative client session by entering the following command at the command line:

   `C:\Program Files\Tivoli\TSM\baclient\dsmadmc`

2. To register a client node, enter the following command:

   `reg node client_nodename password backdel=yes`

   where *client_nodename* is the node name for the client and *password* is the password that you want to use for the client. The **backdel**=*yes* parameter indicates that you can delete backup objects in your file space on the server. For example:

   `reg node doomvm3 doomvm3passwd backdel=yes`

3. To register a node, enter the following command:

   `reg node sql_nodename password backdel=yes`

where *sql_nodename* is the node name for the Data Protection node and *password* is the password that you want to use for the SQL node. The **backdel**=*yes* parameter indicates that you can delete backup objects in your file space on the server.

For example:

```
reg node doomvm3_sql doomvm3sqlpasswd backdel=yes
```

Tip: To easily identify the node as a node for , add "_sql" to the end of the node name.

4. To register the AlwaysOn node, enter the following command:

```
reg node alwayson_nodename password backdel=yes
```

where *alwayson_nodename* is the name for the AlwaysOn node and *password* is the password that you want to use for the AlwaysOn node. The **backdel**=*yes* parameter indicates that you can delete backup objects in your file space on the server. For example:

```
reg node myalwaysonnode alwaysonpasswd backdel=yes
```

What to do next

To use Tivoli Storage Manager server policy sets, the Tivoli Storage Manager must define the policy domains, policy sets, management classes, copy groups, and storage pools.

These definitions are necessary to meet your Tivoli Storage FlashCopy Manager backup and restore requirements. For VSS operations, Tivoli Storage Manager server authentication must be on.

Setting up a proxy node for offloaded VSS backups in the Windows Server Core environment

If you want to offload VSS backups to the Tivoli Storage FlashCopy Manager, you must define a remote node to run the offloaded backups. This step is part of the configuration tasks for operating Tivoli Storage FlashCopy Manager on Windows Server Core.

About this task

Tivoli Storage FlashCopy Manager can offload VSS backups by using a remote computer to create the backup instead of using the local computer. To run an offload backup by using a remote node, you must first set the remote node as an agent of the local Tivoli Storage FlashCopy Manager node.

If you are protecting availability databases in an AlwaysOn Availability Group, you must set the remote node as an agent of the AlwaysOn node.

Before you begin, ensure that the Tivoli Storage Manager client is installed and configured on the remote computer.

Procedure

To define the proxy node relationship, the Tivoli Storage Manager administrator can enter the **grant proxynode** command from the Tivoli Storage Manager server administrative console.

- For standard Tivoli Storage FlashCopy Manager nodes, enter the following command:

```
grant proxynode target=local_sql_node agent=remote_node
```

where *local_sql_node* is the node name of the local Tivoli Storage FlashCopy Manager node, and *remote_node* is the remote Tivoli Storage Manager client node that runs the remote backups. For example:

```
grant proxynode target=doomvm3_sql agent=babar
```

- For AlwaysOn nodes, enter the following command:

```
grant proxynode target=alwayson_node agent=remote_node
```

where *alwayson_node* is the name of the AlwaysOn node, and *remote_node* is the remote Tivoli Storage Manager client node that runs the remote backups. For example:

```
grant proxynode target=myalwaysonnode agent=babar
```

- To display the client nodes with authority to act as proxy to other clients, run the following command from the administrative console of the server:

```
query proxynode
```

Configuring the client in the Windows Server Core environment

You must configure the Tivoli Storage Manager client node that you created. This step is part of the initial configuration tasks before you can use Tivoli Storage FlashCopy Manager in the Windows Server Core environment.

About this task

You must configure the client options file (`dsm.opt`), set the environment variables, and install and setup the Tivoli Storage Manager client acceptor service and remote client agent service.

Procedure

1. Configure the client options file:

   a. Change to the backup-archive client installation directory. For example, issue the following command in a Command Prompt window:

   ```
   cd C:\Program Files\Tivoli\TSM\baclient
   ```

   b. Open the `dsm.opt` file with a text editor and enter the following statements:

   ```
   PASSWORDACCESS    GENERATE
   COMMMethod        TCPip
   TCPPort           1500
   nodename          client_nodename
   TCPSERVERADDRESS  tsm_server
   ```

   The following list contains brief explanations of the client options in the statements:

   PASSWORDACCESS GENERATE
   > Instructs the client to save the password whenever the **/tsmpassword** option is used so that you do not have to enter the password with every command.

   TCPPort 1500
   > Specifies that the client accesses the Tivoli Storage Manager server at TCP/IP port 1500. 1500 is the default port number.

   nodename *client_nodename*
   > Specifies the newly created node for the backup-archive client.

   TCPSERVERADDRESS *tsm_server*
   > Specifies the name of the Tivoli Storage Manager server. You can enter the server IP address or the fully qualified domain name.

   For example:

```
NODename DOOMVM3
PASSWORDAccess generate
TCPServeraddress gijoe
TCPPort  1500
```

2. Install and start the Tivoli Storage Manager client acceptor service and remote client agent service.

   a. Install the client acceptor service by entering the following command in a Command Prompt window:

      ```
      C:\Program Files\Tivoli\TSM\baclient\dsmcutil install cad
      /name:"servicename" /node:nodename /password:password
      /autostart:yes
      ```

      where *nodename* is the client node name, *password* is the client password, and *servicename* is the name that you want to use for the client acceptor service. The default name is "TSM Client Acceptor". For example:

      ```
      C:\Program Files\Tivoli\TSM\baclient\dsmcutil install cad /name:"TSM CAD"
      /node:DOOMVM3 /password:doomvm3passwd /autostart:yes
      ```

   b. Install the remote client agent service by entering the following command in a Command Prompt window:

      ```
      C:\Program Files\Tivoli\TSM\baclient\dsmcutil install remoteagent
      /name:"servicename" /node:nodename /password:password
      /partnername:"partner service name"
      ```

      The node name for the Tivoli Storage Manager Client Acceptor and the Remote Client Agent must be set to the VSS requestor node. The default service name is "TSM Remote Client Agent". The value for the **/partnername** option must match the name of the client acceptor service that you created. The default name is "TSM Client Acceptor". For example:

      ```
      C:\Program Files\Tivoli\TSM\baclient\dsmcutil install remoteagent
      /name:"TSM AGENT" /node:DOOMVM3 /password:doomvm3passwd
      /partnername:"TSM CAD"
      ```

   c. Start the client acceptor service by entering the following command:

      ```
      net start "servicename"
      ```

      where *servicename* is the name of the client acceptor service that you created. For example:

      ```
      net start "TSM CAD"
      ```

      Do not start the remote client agent service manually. The remote client agent service is automatically started by the client acceptor service when it is needed.

Configuring Tivoli Storage FlashCopy Manager for SQL Server for Windows Server Core

You must configure Tivoli Storage FlashCopy Manager before you can protect your Microsoft SQL Server 2012 and later databases in the Windows Server Core environment.

Before you begin

Restriction: The following special characters that are allowed in the SQL Server database name are not supported on Tivoli Storage FlashCopy Manager:

- Question mark (?)
- Multibyte character (,)
- Multibyte character (^)
- Asterisk (*)
- Colon (:) is not supported in Tivoli Storage FlashCopy Manager version 4.1.0 and earlier versions

- Backslash character(\) is not supported in Tivoli Storage FlashCopy Manager version 4.1.0 and earlier versions

About this task

You must configure the client options file (dsm.opt) and configuration file (tdpsql.cfg).

Procedure

1. Edit the client options file (dsm.opt).

    a. In the Tivoli Storage FlashCopy Manager installation directory, open the client options file (dsm.opt) with a text editor.

    b. Add the following statements to the client options file:

    ```
    NODename        sql_nodename
    PASSWORDAccess  Generate
    COMMMethod      TCPip
    TCPServeradress tsm_server
    TCPPort         1500
    TCPWindowsize   63
    TCPBuffSize     32
    ```

    where **nodename** is the Tivoli Storage FlashCopy Manager node name, and **TCPServeraddess** is the name of the Tivoli Storage Manager server. You can enter the server IP address or the fully qualified domain name.

    For example:

    ```
    NODename DOOMVM3_SQL
    PASSWORDAccess generate
    TCPServeraddress gijoe
    TCPPort  1500
    ```

2. Edit the tdpsql.cfg file.

    a. In the Tivoli Storage FlashCopy Manager installation directory, open the configuration file (tdpsql.cfg) with a text editor.

    b. Add the following statements in the tdpsql.cfg file:

    ```
    SQLSERVer          sql_server
    FROMSQLserver           sql_server
    SQLAUTHentication       INTegrated
    MOUNTWaitfordata        Yes
    BACKUPMethod            Legacy|VSS]
    DIFFESTimate            20
    BUFFers                 3
    BUFFERSIze              1024
    STRIPes                 1
    SQLBUFFers              0
    SQLBUFFERSIze           1024
    LOGPrune                60
    LANGuage                ENU
    BACKUPDestination       [LOCAL|TSM|BOTH]
    LOCALDSMAgentnode       local_node
    REMOTEDSMAgentnode      remote_node
    ALWAYSONNode            alwayson_node
    USEALWAYSONnode         [Yes|No]
    ENABLEREPlacementchars  [Yes|No]
    LOGFile                 tdpsql.log
    ```

    The options in the tdpsql.cfg file are as follows:

    SQLSERVer

    Specifies the name of the Microsoft SQL Server that is running on the local computer.

BACKUPMethod
> Determines whether to run a legacy or VSS backup.

BACKUPDestination
> Determines whether to run a local backup, Tivoli Storage Manager backup, or both. For legacy backups, only Tivoli Storage Manager is used.

LOCALDSMAgentnode
> Specifies the local node name of the client that is running on the local computer. This option is required for VSS offloaded backups.

REMOTEDSMAgentnode
> Specifies the remote client node that runs the VSS offloaded backups on a remote computer.

ALWAYSONNode
> Specifies the Tivoli Storage Manager node name that is used to back up availability databases in an AlwaysOn Availability Group.

USEALWAYSONnode
> Specify *Yes* to set the AlwaysOn node as the default node for all backup operations of standard and availability databases. You can use this option to change database backups from a standard Tivoli Storage FlashCopy Manager node to an AlwaysOn node.
>
> Specify *No* to back up standard databases to the Tivoli Storage FlashCopy Manager node. Availability databases are always backed up with the AlwaysOn node.

ENABLEREPlacementchars
> Specify *Yes* to enable Tivoli Storage FlashCopy Manager to process backslash (\) or colon (:) characters in a database name, and back up the database to Tivoli Storage Manager.
>
> Specify *No* to prevent database backups to Tivoli Storage Manager if a user-defined string is substituted for a backslash (\) or colon (:) character in the database name.
>
> **Restriction:** The **ENABLEREPlacementchars** parameter applies only to Tivoli Storage FlashCopy Manager version 4.1.1 and later versions. The maximum length of the database name is 128 characters.

3. If you run the stand-alone configuration on Tivoli Storage FlashCopy Manager, complete the following steps:

   a. In the Tivoli Storage FlashCopy Manager installation directory, open the client options file (dsm.opt) with a text editor.

   b. Edit the dsm.opt file and change the TCPServeraddress *tsm_server* statement to TCPServeraddress flashcopymanager.

   c. If installed, remove the Tivoli Storage Manager client acceptor service. Run the following command from a Command Prompt window:

   ```
   C:\Program Files\Tivoli\TSM\baclient\dsmcutil remove /name:"TSM CAD"
   ```

   In this case, TSM CAD is the name of the client acceptor service that you want to remove.

   d. Reinstall the remote client agent service by entering the following command:

   ```
   C:\Program Files\Tivoli\TSM\baclient\dsmcutil install remoteagent
   /name:"TSM AGENT" /node:DOOMVM3_SQL /password:doomvm3sqlpasswd
   /partnername:"TSM CAD"
   ```

In this case, TSM AGENT is the name of the remote agent and TSM CAD is the name of the client acceptor service.

e. Start the client acceptor service by entering the following command:

```
net start "TSM CAD"
```

In this case, TSM CAD is the name of the client acceptor service are starting.

Do not start the remote client agent service manually. The remote client agent service is automatically started by the client acceptor service when it is needed.

4. Optional: Use the **VSSPOLICY** option to specify a management class for VSS backups.

Unless specified otherwise, Tivoli Storage FlashCopy Manager uses the default management class of the policy domain that its node name is in. To specify that Tivoli Storage FlashCopy Manager uses a different management class, add the **VSSPOLICY** option to the tdpsqlc.cfg file. The format of the option is as follows:

```
VSSPOLICY SQL_server_name "db_name" backup_type backup_dest mgmt_class
```

For example:

```
VSSPOLICY doomvm3 * FULL LOCAL MGMT2
```

This statement specifies that Tivoli Storage FlashCopy Manager uses the management class MGMT2 for local backups of any database in the SQL Server named doomvm3.

Setting user preferences

Use the property pages in the Data Protection Properties window to customize your IBM Tivoli Storage FlashCopy Manager configuration preferences.

Before you begin

The property pages customize preferences such as logging of activity, how languages and information are displayed, and tune performance. The information about the General property page is required to back up data, but the properties are set when you complete the configuration wizard.

When you configure preferences, consider the backup strategy, resource needs, policy settings, and hardware environment of your system.

Procedure

1. In the tree view of Microsoft Management Console (MMC), select the Exchange Server, SQL Server, or file system instance for which you want to edit preferences.
2. In the Action pane, click **Properties**.
3. Select the property page that you want to view or edit. The property pages that are available depend on whether your Tivoli Storage FlashCopy Manager system is configured for stand-alone support or Tivoli Storage Manager support.
4. Edit the property page and click **OK** to save your changes and close the window.

What to do next

Tip: You can also view or edit properties for the dashboard and MMC. To open the properties window, click **Dashboard** in the tree view, and click **Properties** in the Actions pane.

Data Protection properties

Use property pages to customize your configuration preferences.

The available property pages for a workload vary depending on whether it is configured for the stand-alone environment or the Tivoli Storage Manager environment.

You can view or edit property pages by selecting a workload from the **Protect and Recover Data** node in the tree view of Microsoft Management Console (MMC), and clicking **Properties** in the Actions pane.

Server Information

Use the Server Information property page to obtain information about the server that provides backup services.

The fields that display depends on whether the product is configured for a stand-alone snapshot environment or for a Tivoli Storage Manager environment.

Note: References to the stand-alone snapshot environment are specific to Tivoli Storage FlashCopy Manager.

Node name
:   Specifies the name that is used to identify the client node for stand-alone backup operations or backup operations to Tivoli Storage Manager server.

TSM API version
:   Specifies the version of the Tivoli Storage Manager application programming interface (API).

Server name
:   For backups to Tivoli Storage Manager, specifies the name of the Tivoli Storage Manager server that you are connected to.

    For a stand-alone configuration, `Virtual Server` is displayed.

Server Network Host name
:   Specifies the network host name for the Tivoli Storage Manager server.

    For a stand-alone configuration, **FLASHCOPYMANAGER** is displayed.

Server type
:   For backups to Tivoli Storage Manager, specifies the type of operating system of the Tivoli Storage Manager server.

    For a stand-alone configuration, `Virtual Platform` is displayed.

Server version
:   Specifies the version of the Tivoli Storage Manager server.

Compression mode
:   Specifies whether compression is used during backup operations to the Tivoli Storage Manager server. The possible values are `Yes`, `No`, and `Client Determined`.

Domain name
:   Specifies the policy domain that the node belongs to. A policy domain contains one or more policy sets.

Active Policy Set
:   Specifies the policy set that is active for the policy domain. A policy set contains one or more management class definitions.

Default Management Class

The default policy or management class that contains attributes. These attributes determine how long backup versions are stored, where backup versions are stored, and how many backup versions are retained.

Server Password

Use the Server Password property page to change the password for the Data Protection node that you use to access the Tivoli Storage Manager server. This property page applies only to Tivoli Storage Manager configurations.

The following fields are displayed in the property page:

Old password

Type the Tivoli Storage Manager password that you want to change.

New password

Type a new password. Follow the Tivoli Storage Manager server password policy rules.

Confirm new password

Type the new password again. Click **OK** to save your changes.

Policy Management

Use the Policy Management property page to add or update a backup policy, which controls how different backup versions are retained on local shadow volumes on stand-alone snapshot configurations.

Backup retention on local shadow volumes is determined by version and time-based policies. Ensure that sufficient local storage space is available on local shadow volumes for your VSS backup. The amount of storage space that is required depends on the VSS Provider that you use.

The following fields are displayed in the property page:

Policy Specify the unique name of a backup policy for the stand-alone configuration.

Number of Snapshots to keep

Specify the number of backup versions to retain on local shadow volumes. Enter a value from 1 to 9999. Type NL to retain as many backup versions as permitted by available storage space. The default value is 2.

This parameter does not apply to incremental backup versions of Exchange Server data. Incremental backups do not participate in expirations because of version limit because there is never more than one version of an incremental backup object. There is only one version of an incremental backup object because incremental backups are always uniquely named.

Days to keep a Snapshot

Specify the number of days to retain backup versions on local shadow volumes. Enter a value from 0 to 9999. Type NL to retain as many backup versions as the available storage space allows. When the value is set to 0, snapshots are kept for the current day. The default value is 30.

VSS Policy Binding

Use the VSS Policy Binding property page to bind storage snapshots to back up policies or management classes. VSS policies determine how backups are managed and retained.

VSS policy statements are processed from the end to the beginning and processing stops when the first matching statement is reached. To ensure that more specific statements are processed, specify the more general specification before the more specific ones.

The policy statements do not take effect on existing or new backups until the next backup is completed.

Managed Capacity

Use the Managed Capacity property page to track the capacity of managed storage.

The information that is provided can assist you with storage capacity planning during activities such as license renewal.

Diagnostics

Use the Diagnostics property page to select the type of tracing to run on various components of Tivoli Storage FlashCopy Manager.

When you encounter a problem, open the Diagnostics property page. Select the diagnostic mode that you want to use by clicking **Normal**, **Complete**, or **Custom**. Then, click **Begin** to start the trace. Close the property page. Re-create the problem, open the Diagnostics property page, and click **End** to stop the tracing and collect the data.

If you are using this property page from the Dashboard property sheet, you can run trace only for Microsoft Management Console (MMC).

Diagnostic modes

The following diagnostic mode is available in the Diagnostics property page from the Dashboard property sheet:

> **MMC** - use this mode to set tracing for MMC only. Only MMC tracing can be completed with this mode.

The following diagnostic modes are available in the Diagnostics property page in the workload property sheets. The type of tracing that is enabled for each mode is listed in the table. Specific trace flags, and guidance on when to use each mode is also listed.

Table 9. Diagnostics modes and their usage

Mode	Components traced along with trace flags used	When to use
Normal	MMC, DP (service), API (service,api_detail)	If you are completing legacy operations, you can use this mode because it results in small output size
Complete	MMC, DP (service), API (service,api_detail), Agent (service)	Use for VSS operations, results in large output size

Table 9. Diagnostics modes and their usage (continued)

Mode	Components traced along with trace flags used	When to use
Custom	Any combination	Use if specific flags are needed

Normal

Click **Normal** to collect trace and log files for legacy operations. Not applicable for Data Protection for Microsoft Exchange Server.

Complete

Click **Complete** to collect trace and log files for VSS operations.

Custom

Click **Custom**, then click the check mark icon to select the trace and log files that you want to collect. Use this mode only if specific trace flags are required.

Enable snap-in tracing

Select this box to enable tracing of MMC. Click **Review** to view the trace file.

Set Default Trace Flags

Click**Set Default Trace Flags** to set the most commonly requested trace flags.

Enable Data Protection tracing

Select this box to enable tracing of Data Protection for Microsoft Exchange Server, Data Protection for Microsoft SQL Server, and file system and custom application operations. Click **Review** to view the trace file. Add or update trace flags in the field.

Enable DSM Agent tracing

Select this box to enable tracing for the Tivoli Storage Manager client node. You must restart the client acceptor service before you start the trace. Click **Review** to view the trace file. Add or update trace flags in the field.

Enable API tracing

Select this box to enable tracing for the Tivoli Storage Manager API. Click **Review** to view the trace file. Add or update trace flags in the field.

Email Select diagnostic files and click **Email** to send a diagnostic email to an IBM service representative with the selected files attached. You must configure your email information before you can send the data to an IBM service representative. To configure your email information, go to the Dashboard and click **Properties**. Then, click **EMail** to open the email property page.

Screenshot

This function is enabled after you click **Begin**. Click **Screenshot** to open the Diagnostic Screenshot Tool. This tool is a modeless dialog that remains open until you close it or click **End** or **Cancel**.

Click **Add New Screenshot** to add a screen capture to the `FlashCopyManager\ProblemDetermination` folder. The screen capture can be selected with other diagnostic data.

SQL Login

Use this property page to set preferences for logging on to the Microsoft SQL Server. This property page is available only for the **SQL Server** workload.

Use Windows Authentication
> Select this option to use a trusted connection and allow Microsoft Windows to authenticate the logon.

Use SQL Server Authentication
> Select this option to use SQL user ID security. With this type of security, you must enter the logon ID and the password to log on to the Microsoft SQL Server.

User name
> Specifies the SQL user ID.

Password
> Specifies the password to log on to the Microsoft SQL Server.

General (SQL Server)

Use General (SQL) property page to specify general preferences for the **SQL Server** workload. This property page applies if the product is configured to back up data to stand-alone storage or Tivoli Storage Manager.

SQL Server
> Specify the unique name that identifies the SQL Server instance.

From Server
> Specify the SQL Server backups that you want to use for the restore. By default, this field displays the same name for the **SQL Server**.

Wait for tape mounts for backup or restore
> Select this box when you want Data Protection for Microsoft SQL Server to wait for tape media to be mounted for backup and restore operations. This setting is applicable when the Tivoli Storage Manager server is configured to store the backup data on tape media. With backup data on removable media, during backup and restore operations, a wait period occurs during storage volume mounts. If a wait occurs, this setting specifies whether Data Protection for Microsoft SQL Server waits for the media mount or stop the current operation. By default, this option is not selected.

Use VSS backups as the default backup method
> Select this box to set VSS backups as the default backup method. Ensure that the **Local DSMAGENT Node name** field is specified in the VSS Backup property page. Backups can be restored only by using VSS.

Compress backup by using SQL Server compression
> Select this box to enable SQL Server compression during legacy backup operations. This check box is available only if you are running Microsoft SQL Server 2008 or later versions.

Compute SQL Server checksum for legacy backup
> When selected, this option is written to the Data Protection for SQL Server preferences file (`tdpsql.cfg`), and can be applied to all legacy backups. If you clear the check box, you ensure that the integrity check does not apply to any legacy database backup.

Estimate % change for differential backup
> Specify the value for the estimated change to database pages for differential backups. This estimate is used by Data Protection for Microsoft

SQL Server to determine whether enough storage space is available for the backup. The default value is 20. This value becomes the default value for all differential backups.

This field applies only to Data Protection for Microsoft SQL Server legacy backups.

General (Exchange Server)

Use the General (Exchange) property page to specify general preferences for the **Exchange Server** workload. This property page applies only if your workload is configured to back up data to Tivoli Storage Manager.

Temporary log restore path
> Specify the default temporary path to use when you restore logs and patch files. For best performance, specify a path that is on a different physical device than the current active logger. If you do not enter a path, the default is the value of the TEMP environment variable. When you run a full restore, copy restore, or database copy restore, all log files that are in the specified path are erased.

Back up DAG databases to common node
> Specify the node name that you want to use to back up databases from a Database Availability Group (DAG). With this setting, all active and passive copies of the databases are backed up to the same file space on the Tivoli Storage Manager server. The database copies are managed as a single entity, regardless of which Database Availability Group member they were backed up from.
>
> When you use this setting, Tivoli Storage Manager applies the same policy across all DAG members, regardless of which DAG member ran the backup.

Temporary database restore path
> Specify the directory where the database files that are being restored are temporarily located. Ensure that the directory provides enough space to store the entire mailbox database file. If you do not specify a directory, the database files are restored into a directory that is specified by the TEMP environment variable. This option is only available for mailbox restore operations.

Alias of temporary mailbox
> Specifies the alias of a mailbox to use as a temporary storage location during mailbox restore operations. The temporary mailbox is used during restore operations of mailboxes that were deleted, re-created, or moved since the time of the backup. By default, the mailbox restore operation uses the administrator user's mailbox as a temporary storage location.

Exchange Client Access Server
> Specify the name of the Client Access Server (CAS) that you want to use. This field is available only for Microsoft Exchange Server 2010.
>
> By default, Tivoli Storage FlashCopy Manager uses the local server as the CAS if the local server has the CAS role installed. The CAS that is defined by the logon user mailbox database is used if the local server does not have the CAS role installed.
>
> You can find the name of the current CAS, which is defined by the current logon user mailbox database, by running this Exchange Management Shell command:
> ```
> Get-MailboxDatabase -Identity <logon user mailbox database> |
> select RpcClientAccessServer
> ```

To use a different CAS, you can define the CAS to be used.

Restore mail messages as unread
> Select this check box to specify that restored mail messages are marked as unread.

Backup mailbox history
> Select this check box if you are using mailbox restore operations and you want the mailbox history to be backed up.
>
> **Tip:** If you do not intend to run mailbox restore operations, clear this check box. This action can improve backup performance.

Pre/Post Snapshot

Use this property page to specify presnapshot and postsnapshot commands. This property page applies only to custom applications in the **File System** workload.

Pre-Snapshot Command
> Specify the name of the command script that is used to quiesce custom applications that use the file system before the snapshot is created. You must specify the fully qualified path name for the command script.

Post-Snapshot Command
> Specify the name of the command script that is used to restart custom applications that use the file system after the snapshot is created. You must specify the fully qualified path name for the command script.

All batch scripts must include an exit statement with the following value:

```
exit error_code
```

Logging

Use the Logging property page to specify activity log preferences.

Log File Name
> Specifies the name of the file in which activities are logged.

Enable pruning
> Specifies that older entries from the log are to automatically be deleted. By default, log pruning is activated and completed daily.

Number of days to keep old entries
> Specifies the number of days to keep old entries in the log before they are pruned. By default, 60 days of log entries are saved in the pruning process.

Prune now
> Click this option to delete older entries from the Tivoli Storage FlashCopy Manager activity log when a command runs.

Regional

Use the Regional property page to set preferences that affect how languages and information are displayed and logged.

Regional and Language options
> Select this option to set preferences for Microsoft Management Console (MMC). MMC uses the same regional settings as the Windows system.

Language
> Select the language to use for log files and the command-line interface.

Date Format
> Select a date format to use for log files and the command-line interface.

The available choices represent several ways to place the month (*mm*), day (*dd*), year (*yyyy*), and period of day (*a.m.* or *p.m.*). The default date format is *mm/dd/yyyy*.

Time Format
> Select a time format to use for log files and the command-line interface. The available choices represent several ways to place the hour (*hh*), minutes (*mm*), and seconds (*ss*). The default time format is *hh:mm:ss*.

Number Format
> Select a number format to use for log files and the command-line interface. The available choices represent several ways to place the decimal, comma, and spaces. The default number format is *xxx,xxx.dd*.

Match MMC Language
> Select this option to change MMC regional settings to match the system's regional and language options. By selecting this option, the number, date, and time formats are matched to the default formats of the selected language.

VSS Options

Use the VSS Options property page to configure preferences that are used during VSS backup and restore operations.

Default Backup Destination
> Select the default storage location for your backups. You can select from these storage locations:

> **Tivoli Storage Manager server**
>> The backup is only stored on Tivoli Storage Manager server storage. This selection applies to workloads that are configured with the Tivoli Storage Manager server.

> **Local** The backup is only stored on local disk. For custom application and file system data, this selection is the default.

> **Both** The backup is stored on both Tivoli Storage Manager server storage and local disk. This selection applies to workloads that are configured with the Tivoli Storage Manager server. The Tivoli Storage FlashCopy Manager license must be present with the Tivoli Storage Manager configuration. If only the Data Protection license is found, only the Tivoli Storage Manager option is enabled.

> For Tivoli Storage Manager configurations, the backups are stored on a local disk, but managed on the Tivoli Storage Manager server. The Tivoli Storage Manager server maintains the metadata or information about where the local snapshot is stored.

Local DSMAGENT Node name
> Specify the node name for the DSM Agent node of the local client system that creates the VSS backups.

Remote DSMAGENT Node name
> Specify the node name of the system that moves the VSS data to Tivoli Storage Manager server storage during offloaded backups. If you do not use offloaded backups, you can leave this field blank.

Import VSS snapshots only when needed
> By default, local persistent VSS snapshots are automatically imported to the Windows system where the snapshots are created. If you select this option, the VSS snapshots are imported to the local host when needed to complete FlashCopy Manager operations.

To automatically import local persistent snapshots to the Windows system where the snapshots are created, the check box must be cleared.

If you intend to keep many backup versions (for example, more than 100 backup versions), or, if there is a limit to the number of LUNs that your server can use (for example, in virtual machine environments), select this option.

When you select this option, if the VSS hardware provider does not support transportable snapshots, or, if no hardware provider is available, the backup is completed, but the VSS snapshot is imported and is not transportable.

If you are running in a VMware environment and want to use VMware vMotion, ensure the LUNs are properly zoned to the ESX hosts and select this option. By choosing to import VSS snapshots when the snapshots are needed, the import process maps the VSS snapshot to the ESX host where the Windows virtual machine is running.

During Instant Restore, automatically stop and restart necessary Microsoft Exchange services

When this option is selected, during instant restore operations, the following Microsoft Exchange services are, as necessary, automatically stopped and restarted:

- (DAG environments only) Exchange Replication Service
- (Exchange 2013 only) Exchange Search Host Controller Service

Custom Settings

Use the Custom Settings property page to set your filtering options and control the amount of information that is returned from the server.

Select **Show Refresh Options** in the toolbar in the Recover view. This property page is available only with SQL Server and Exchange Server workloads.

In environments where thousands or millions of backup objects are stored on the Tivoli Storage Manager server, it can be helpful to disable the automatic refresh mode. You can click **Refresh Options** and use the toolbar to switch between manual and automatic refresh mode.

Automatic and manual refresh modes differ in the following ways:

- In automatic refresh mode, a view automatically refreshes the first time that you select it. If there are thousands or millions of objects on the server, the refresh can take a long time to complete.
- In manual refresh mode, the view is not automatically refreshed. A name filter is available on the **Refresh Options** toolbar that you can use to narrow down the number of objects selected. After you enter a name pattern, you can click **Refresh**. By using manual refresh mode and limiting your query by using filters, you can reduce the amount of information that is returned from the server. Reducing the amount of information that is returned from the server can improve query and restore performance.
  You can also specify a wildcard character (*) in the name pattern to assist your filtering effort.

Performance

Use this property page to set preferences that affect performance for legacy backups. This property does not apply to Data Protection for Exchange Server.

DP Buffers
> Specifies a number in the range 2 - 8 that specifies the number of communication data buffers that Data Protection for SQL Server uses when it transfers data to the Tivoli Storage Manager server. Each buffer has the size that is specified by the **DP Buffer Size** option. This option applies only to legacy backups.

DP Buffer size
> Specifies the size of the buffers that are used by Data Protection for SQL Server to transfer data to the Tivoli Storage Manager server. This option applies only to legacy backups. Specify a value in the range 64 - 8192.

SQL Buffers
> Specifies the number of communication data buffers that Data Protection for SQL Server uses when it transfers data between the SQL Server and Data Protection for SQL Server. Each buffer has the size that is specified in the **SQL Buffer Size** option. This option applies to legacy backups only. Specify a value from 0 - 999.

SQL Buffer size
> Specifies the size of the buffers that are used by Data Protection for SQL Server to transfer data from the SQL Server to Data Protection for SQL Server. This option applies only to legacy backups. Specify a value in the range 64 - 4096.

Stripes
> Specifies the number of data stripes to use in a legacy backup or legacy restore operation. Specify a value in the range 1 - 64. The default value is 1. This option applies to legacy backup and restore operations only.
>
> When you use a multiple stripes number for legacy backups, and setting the **Verify Only** parameter to **Yes** to restore the legacy backup, the number of stripes for legacy restore must be equal or greater than the number of stripes for the legacy backup.

MAPI Settings

If you use Exchange Server 2013, use the MAPI Settings property page to verify that the user mailbox is online. You can also view and update the MAPI registry key that enables Tivoli Storage FlashCopy Manager to connect to the Exchange Server.

Tivoli Storage FlashCopy Manager automatically generates a default value for the registry key. Edit the registry key only if the default value is incorrect.

The values that you enter override the registry key that is in the `HKEY_CURRENT_USER\Software\Microsoft\Windows NT\Current Version\Windows Messaging Subsystem` directory. If you modify the registry incorrectly, the connection to the Exchange Server might fail.

You can use this property page only if you use Exchange Server 2013 or later versions.

RpcHttpProxyMap_TSM

Change the registry key values to reflect the correct domain, endpoint, and Remote Procedure Call (RPC) authentication methods for your environment. By default, the format is:

```
Domain=Proxy Server,RpcHttpAuthenticationMethod,
RpcAuthenticationMethod,IgnoreSslCert
```

For example:

```
companyname.local=https://exchange.companyname.com,ntlm,ntlm,false
```

where:

- *Domain* value is the domain suffix of the personalized server ID, for example, `companyname.local`. Specify any domain or a substring of a domain, or the asterisk (*) and question mark (?) wildcard characters, for example, `*.companyname.local`.
- *Proxy Server* value is the RPC proxy server that has the Client Access Server (CAS) role. Specify the fully qualified domain name (FQDN) of the RPC proxy server. Precede the FQDN by `http://` for an HTTP connection, or `https://` for an HTTPS connection. For example, `https://exchange.companyname.com`
- *RpcHttpAuthenticationMethod* value is the method that is used to authenticate RPC-over-HTTP connections. Specify NTLM, `Basic`, `Negotiate`, or `WinNT`.
- *RpcAuthenticationMethod* value is the method that is used to authenticate RPC-over-TCP connections. Specify NTLM, `Negotiate`, `WinNT`, `Anonymous`, or `None`.
- *IgnoreSslCert* value indicates whether the Exchange Server validates SSL certificates. For the Exchange Server to ignore invalid certificates, specify `False`.

Domain
Change the domain name to reflect the correct domain if for example, you have multiple domains, or the default domain value is incorrect. To match all domains, enter the asterisk (*) wildcard character. When you change this domain value, the *Domain* value of the registry key automatically updates in the `RpcHttpProxyMap_TSM` field.

Use HTTPS authentication
Select this check box if RPC-over-HTTPS is enabled for the Exchange Server that is hosting the MAPI profile. Otherwise, clear this check box to ensure that HTTP authentication is used for RPC-over-HTTP connections. When you change this authentication value, the *RpcAuthenticationMethod* value of the registry key automatically updates in the `RpcHttpProxyMap_TSM` field.

Related tasks:

"Ensuring successful MAPI connections" on page 153

Specifying configuration and options files in non-default locations

The Tivoli Storage FlashCopy Manager software uses default configuration and options files. If you want to use non-default configuration and options files, use command-line parameters to specify alternative configuration and option files when you start Tivoli Storage FlashCopy Manager.

Before you begin

The information in this procedure does not apply to managing remote Tivoli Storage FlashCopy Manager installations.

About this task

MMC that is used for Tivoli Storage FlashCopy Manager software is started with the flashcopymanager.exe file. The flashcopymanager.exe file accepts the following parameters:

```
/mscFilename=filename  # Name of the MMC snap-in control file
/author # Opens the MMC console in author mode.
```

For example:

```
flashcopymanager.exe parameter1=filename
 parameter2=filename ...
```

The flashcopymanager.exe file accepts the following parameters to set the configuration files:

```
/FSCONFigfile=filename   # File system configuration file
/SQLCONFigfile=filename   # SQL configuration file
/EXCCONFigfile=filename   # Exchange configuration file
/FSOPTfile=filename      # File system OPT file
/SQLOPTfile=filename     # SQL OPT file
/EXCOPTFfile=filename     # Exchange OPT file
/FCMCUSTConfigfile=filename  # Custom configuration file
/SQLINSTancenames=Instance1,Instance2,...  # SQL instances to show in the MMC
```

Procedure

Start MMC with the parameters by using flashcopymanager.exe, as shown in the following example.

```
flashcopymanager.exe /FSCONFigfile=newcfg.xml /SQLCONFigfile=altsql.cfg
 /SQLINSTancenames=mysql1,mysql2
```

You can also start and run multiple instances of MMC concurrently. With the command-line parameters, each instance operates by using a different configuration that is based on the specified configuration and option files.

Chapter 5. Protection of Microsoft Exchange Server data hosted in VMware environments

For Microsoft Exchange Server workloads that are running in a VMware ESXi virtual guest machine, you can use Tivoli Storage Manager software to take application-consistent backups of virtual machines that are hosting Microsoft Exchange Server data. You can also recover the backup 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 at the point in time of the backup. While change-block tracking and data deduplication offer savings, frequent virtual machine backups can become expensive when you think about how many virtual machine snapshots you are creating and deleting.

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.

With planning, you can deploy IBM Tivoli Storage Manager for Virtual Environments: Data Protection for VMware and Tivoli Storage FlashCopy Manager with Data Protection for Microsoft Exchange Server in a way that preserves the backup efficiencies that are offered by backing up data at a virtual machine level while more granular recovery points are guaranteed.

Ensure that you installed and completed the initial configuration tasks that are necessary to start the following products:

- Tivoli Storage Manager for Virtual Environments: Data Protection for VMware, V7.1.2 and later (which includes the Tivoli Storage Manager client)
- Tivoli Storage FlashCopy Manager with Data Protection for Microsoft Exchange Server, V4.1.2 and later

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.

Installing and configuring for Microsoft Exchange Server data protection in a VMware environment

When you install these software offerings, no specific instructions are needed to protect Microsoft Exchange Server workloads that are running in a VMware ESXi virtual guest machine. Install and configure Data Protection for VMware before you install Data Protection for Microsoft Exchange Server.

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About this task

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.

The following configuration tasks are specific to the configuration options that you must protect Microsoft Exchange Server workloads that are running in a VMware ESXi virtual guest machine. These options can be set after you complete the initial configuration.

Before you configure to protect Microsoft Exchange Server workloads that run in a VMware ESXi virtual guest machine, complete this checklist:
- Verify that Microsoft Exchange Server databases and mailboxes are hosted on VMware virtual disks.
- Verify that no data 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.

The following three sections provide instructions for completing the three configuration tasks:

Procedure

1. Outside of the VM guest, in the datamover, configure Data Protection for VMware to protect Microsoft Exchange Server databases and mailboxes.
2. Within the guest, verify that Data Protection for VMware is configured to enable the restore of individual Microsoft Exchange Server databases and mailboxes.
3. Within the guest, configure Data Protection for Microsoft Exchange Server to complete Microsoft Exchange Server database and mailbox backups and restore individual Microsoft Exchange Server databases and mailboxes from a virtual machine backup.

What to do next

The instructions that are provided for these tasks follow a scenario that might not exactly match your environment. You can adjust the configuration for your environment. 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 display name of *vm_exc10* and the Microsoft Windows host name is *EXC10*.
- Data Protection for Microsoft Exchange Server is installed in the guest and is configured to the Tivoli Storage Manager server to use node name *exc10_EXC*.
- The Tivoli Storage Manager client is configured as the VSS requestor node and is using the node name *EXC10_VSS*.

The following list summarizes the scenario for quick reference:

Machine name
    EXC10

VSS requestor node name
    EXC10_VSS

Data Protection for Microsoft Exchange Server node name
    EXC10_EXC

Virtual machine
    vm_exc10

Data mover node names
    datamover10 and *datamover20*

Datacenter node name
    datacenter10

VM file space
    \VMFULL-vm_exc10

Configuring Data Protection for VMware

By default, 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.

About this task

To recover only select 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, Data Protection for VMware must be configured to obtain this information from the virtual machine during the backup task.

Complete the following steps to configure Data Protection for VMware to protect Microsoft Exchange Server workloads.

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. The information is going to be used by Data Protection for Microsoft Exchange Server at recovery time. Example:
   `INCLUDE.VMTSMVSS vm_display_name`

c. Verify that the VMDKs that host the Microsoft Exchange Server database are not being excluded from the virtual machine backup operation. Repeat this step 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 encrypted on the system that hosts the data mover.

What to do next

(Optional) You can verify the virtual machine backup configuration, including that the VMDKs are being included. In addition, you can view other parameters by issuing the backup command with the preview option through the backup-archive client command line. The following command sample is available.

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

To run a virtual machine backup, you can also use the Tivoli Storage Manager scheduler to schedule periodic backups of all of your virtual machines. For verification, 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
```

Verification that the configuration backs up data that is viable for restore

Before you can restore individual Microsoft Exchange Server databases from a Data Protection for VMware virtual machine backup, you complete at least one successful virtual machine backup. For the restore to work, the backup needs to contain the necessary Microsoft Exchange Server database metadata. You can verify that the backup includes the correct information.

Enter the following backup-archive client query command on one of the data mover nodes:

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

In the command output, look for the following details:

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

Ensure that there are no VMDK status fields for virtual disks that host Microsoft Exchange Server database files that indicate Excluded. The Excluded status indicates that one or more of the VMDKs that is needed to recover a Microsoft Exchange Server database are not being protected. Sample:

```
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 suitable for recovery of a single Microsoft Exchange Server
database, configure Data Protection for Microsoft Exchange Server inside the guest
virtual machine.

About this task

Complete the following steps to configure Data Protection for Microsoft Exchange
Server for data recovery.

Procedure

1. Log on to the virtual machine that hosts the Microsoft Exchange Server
   database (*vm_exc10*).
2. Verify that the following packages are installed:
   * Data Protection for VMware recovery agent 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 Data Protection for VMware recovery agent, license, and
   Tivoli Storage Manager 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 Data Protection for
   VMware instant restore features only**. 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, Exchange Server node name, and VSS requestor node name. If the
   datacenter node name field is disabled, the Data Protection for VMware
   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 one of the data mover instances and complete the following steps. These steps need to be run from only one instance of a data mover. Do not repeat these steps for all data mover instances.

   a. For the Tivoli Storage Manager backup-archive client that is configured as the VSS requestor node, for example, *exc10*, give access to the virtual machine backups, for example, file space for *vm_exc10* by using the client **set access** command at the command line.

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

      This command is run directly from the datacenter node (*datacenter10*). If the current data mover options file (dsm.opt) contains an **ASNODE** entry, create a temporary options file. To create a temporary options file, complete the following steps:

      1) Copy the dsm.opt file to the dsm.setaccess.opt file.
      2) Edit the dsm.setaccess.opt file. For any line that contains **ASNODE**, delete the line.
      3) Edit the dsm.setaccess.opt file to set the **NODENAME** option to the following entry:

         ```
         NODENAME DC_NODE
         ```

         For example:
         ```
         DC_NODE = datacenter10
         ```

   b. Enter the following command:
      ```
      dsmc set access backup -type=VM vm_name vss_requestor_node
       -optfile=dsm.setaccess.opt
      ```

Example

```
dsmc set access backup –type=VM vm_exc01 exc01 –optfile=dsm.setaccess.opt

ANS1148I "Set Access" command successfully completed.

dsmc query access
Node name: datacenter10
Type  Node  User  Path
------ ------ ------ ------
Backup  exc10  *   \VMFULL-vm_exc10\*\*


ANS1148I "Query Access" command completed successfully
```

If the datacenter node name password is unknown, the Tivoli Storage Manager server administrator must reset the password to run the **set access** command.

Backup management

After the configuration steps are complete, start scheduling backups. Backup management does not require that you set up both a virtual machine backup schedule and a Microsoft Exchange Server backup schedule. You can have one scheduled backup without the other.

Scheduling virtual machine backups

To schedule virtual machine backups, complete the following steps.

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 one of the following services is running:
   - If you are using a Client Acceptor Daemon (CAD)-managed scheduler, on the data mover, ensure that the CAD service is running.
   - If you are using the stand-alone scheduler, ensure that the scheduler service is running.

Results

After the schedule is created, the virtual machines are backed up at the specified time.

Scheduling Microsoft Exchange Server backups

After the virtual machine backup schedule is created, create the Microsoft Exchange Server backup schedule. The frequency of the backups is determined by the recovery point objectives (RPO).

Procedure

1. Start the Data Protection for Microsoft Exchange Server user interface from the virtual machine that is hosting Microsoft Exchange Server.
2. In the navigation pane, expand Manage.
3. Under the Manage node, right-click to select **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 Exchange Server template. Click **Next**.

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

Verifying backups

After you create a backup, verify that you can query the virtual machine backups and the 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.

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 are available for restore is displayed.

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

Managing versions of backups

Traditional usage of Data Protection for Microsoft Exchange Server manages expiration of backups by specifying the number of snapshot backups to retain and the length of time to retain snapshots. These parameters are specified in policy statements.

About this task

To retain Microsoft Exchange Server backups, complete the following steps.

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.
2. Define the retention parameters in the management class that is used for Microsoft Exchange Server backups. For example:

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

Results

Backups are retained according to the management class. During the query, backup and restore operations can expire.

Restoring and recovering data

After backups are complete, you can recover the data based on your recovery point objectives (RPO).

Recovery means that you are going to restore a full backup of the Microsoft Exchange Server database or mailbox from the Data Protection for VMware backup. Use the `norecovery` option to specify that a rollback does not occur.

If you restore the entire virtual machine, all of the Microsoft Exchange Server databases and mailboxes 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.

If you want to restore and recover any backups that were created after the virtual machine backup, follow all the steps in this document to restore and recover the individual database and mailbox backups.

Restoring databases

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

About this task

Complete the following steps to start a full database recovery from a virtual machine by using the Data Protection for Microsoft Exchange Server graphical user interface.

Procedure

1. From Microsoft Management (MMC), in the navigation window, from Protect and Recover, select a Microsoft Exchange Server server.
2. Click the **Recover** tab. All backups, including all database backups from a virtual machine backup, are listed.
3. Click restore options to show all options and change the `AutoSelect` and `RunRecovery` options to `False`. When these options are set to `False`, the `Mount Databases After Restore` option is automatically set to `No`. This option setting cannot be changed. After the restore operation is completed successfully, the database is dismounted.
4. Select the appropriate full database backup to restore.
5. In the Actions pane, click **Restore**.

Restoring mailboxes

Tivoli Storage FlashCopy Manager backs up mailbox data at the database level, and also restores individual mailbox items from the database backup.

Before you begin

- You must have Exchange role-based access control (RBAC) permissions to complete individual mailbox restore operations.
- 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.
- When you are restoring mail to a Unicode personal folder (`.pst`) file, Data Protection for Exchange Server requires a temporary mailbox to store the mailbox messages. By default, the mailbox of the logon user is used as the temporary mailbox. You can specify a temporary mailbox by setting the **Alias of temporary mailbox** option on the **General** tab of the Properties page.

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

About this task

By default, Tivoli Storage FlashCopy Manager restores the last backup that is available for the specified mailbox.

If you want to restore data to a different point in time, use the **Backup Date** option to select an earlier date and time. When you specify a backup date, Tivoli Storage FlashCopy Manager searches for a backup that corresponds to that exact date. If a backup with that exact date is not found, Tivoli Storage FlashCopy Manager searches for and selects the first backup after that date. For example, if you have a backup at 9:51 and a backup at 10:09, and you specify 10:00, Tivoli Storage FlashCopy Manager selects the backup at 10:09. By selecting this backup, the software does not miss any messages. If the backup at 9:51 was selected, the software would miss messages from 9:51 to 10:00.

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 tree view.
2. Click the **Recover** tab for the Exchange Server instance, and change the selected view to **Mailbox Restore**.
3. Select one or more mailboxes to restore. A list of mailboxes that are backed up is displayed. If you restore a mailbox that was deleted or re-created since the time of the backup, set a temporary mailbox with sufficient space to temporarily store the messages during the restore operations. Set this mailbox by using the `Alias of temporary mailbox` option from the Properties page, under the General tab.
4. Optional: By default, the entire mailbox is restored. You can use the **Item-Level Mailbox Filters** to identify individual messages to restore.
   a. Click **Show Filter Options** and **Add Row**.
   b. Click the down arrow in the **Column Name** field and select an item to filter. You can filter by **Backup Date**, **Folder Name**, **Subject Text**, **Sender Name**, **Message Body Text**, **All Content**, **Attachment Name**, and **Received Date**. When you restore data to a Unicode `.pst` file, except for the **Backup Date**, **Folder Name**, and **All Content** filters, the filters are ignored.

      When you click **All Content**, the mailbox items are filtered by attachment name, sender, subject, and message body.

      To filter by **Backup Date**, click the default date and time to edit the table cell. To change the date, click the drop-down icon that is displayed 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.
   c. Select an operator in the **Operator** field.
   d. Specify a value to filter on in the **Value** field.
   e. In you want to filter on more items, click **Add Row**.
5. Verify the restore options by clicking **Show Restore Options**.

Table 10. Database restore options

Option	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**, Tivoli Storage FlashCopy Manager 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 is 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 is at the time of the backup. Use the following format: `server-name,db-name`
Mark Restored Messages As Unread	Use this option to automatically mark the mailbox messages as unread after the restore operation completes. The default value is **Yes**.
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, Tivoli Storage FlashCopy Manager automatically removes the recovery database during mailbox restore processing.

6. Click one of the following **Restore** actions to complete the restore operation.

Table 11. Restore options

Option	Action
Restore Mail to Original Location	Select this action to restore the mail to where the mail items existed at the time of backup.
Restore Mail to Alternate Location	Select this action to restore the mail items to a different mailbox. A dialog is displayed for you to specify the mailbox.

Table 11. Restore options (continued)

Option	Action
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.
Restore Mail to Unicode PST file	Select this action to restore the mail items to a Unicode personal folders (.pst) file. When you restore mail items a .pst file with one selected mailbox, you are prompted for a file name. When you restore mail items 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 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 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.

Restoring relocated and deleted mailboxes

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

Before you begin

If you are restoring a mailbox that was deleted or re-created since the time of the backup, you must specify a temporary mailbox with enough storage capacity to accommodate all the mailbox items that you are restoring. Specify a temporary mailbox by setting the **/TEMPMAILBOXAlias** parameter. If you do not set the **/TEMPMAILBOXAlias** parameter, the default mailbox is the mailbox of the user who is logged on.

About this task

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

If database or log files are relocated during the backup cycle, Data Protection for Microsoft Exchange Server restore and recovery processing place the files in their original locations.

If any new databases or mailboxes were created during the backup cycle, Data Protection for Microsoft Exchange Server restore and recovery processing re-creates the new files. If any database or log files are deleted during the backup cycle, Data Protection for Microsoft Exchange Server restore and recovery processing removes those files.

Procedure

Decide where the mailbox data from the deleted mailbox is to be restored. Complete the following steps in the mailbox restore operation:

1. Restore the deleted mailbox data to the original location. Before you run the mailbox restore operation, re-create the mailbox that is using Exchange.
2. Restore the deleted mailbox data into an active alternative mailbox in an online Exchange Server.
3. Restore the deleted mailbox data into an Exchange Server personal folders (.pst) file.

Restoring data 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

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

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 tree, select **Exchange Server**.
3. On the Recover panel, click **View** > **Mailbox Restore Browser**. The Select Source Mailbox to Restore dialog opens.
4. In the Select Source dialog, specify the mailbox that you want to restore. Choose from the actions in the following table:

Table 12. Selecting mailboxes to restore

Action	Steps
Browse mailboxes and select one to restore	1. From the drop-down list, select **Browse Mailboxes**. 2. From the list of mailboxes that are displayed, 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 point in 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. 4. Click **OK**.
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. From the list of mailboxes, 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. From the list of mailbox databases that are displayed, 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 13. Previewing and filtering messages

Action	Steps
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**.
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, Sender Name, Message Body Text, All Content, Attachment Name, Size (in KB), Created Date, Modified Date, Sent Date, and Received Date. 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 value to filter on. 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 dialog is displayed. Specify the location and message name and click **Save**. The Restore Progress dialog opens and shows the progress of the restore operation. Data Protection for Exchange Server 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 14. Restoring a mailbox to another mailbox or PST file

Action	Steps
Restore a mailbox or mailbox item to a different mailbox	1. In 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 in the results pane.

Table 14. Restoring a mailbox to another mailbox or PST file (continued)

Action	Steps
Restore a mailbox to an Outlook personal folders (PST) file	1. In the Actions pane, click **Open PST File**. 2. When the Windows File dialog opens, select an existing PST file or create a PST file. 3. Drag the source mailbox to the destination PST file in the results pane. **Restriction:** You can use the Mailbox Restore Browser only with non-Unicode PST files.

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, Data Protection for Exchange Server removes the recovery database that exists 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 Data Protection for Exchange Server, 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.

Recovering data by using the command-line interface

To start a full Microsoft Exchange Server database recovery from a virtual machine by using the command-line interface, complete the following steps.

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 2.0
...
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. Issue the database dismount command. For example:

   ```
   TDPEXCC UNMOUNT BACKup C:\mount-points-root-dir
   ```

3. Issue the database restore command with the `norecovery` option. For example:

   ```
    TDPEXCC RESTore databaseName FULL /BACKUPDEstination=TSM
    /BACKUPMethod=VMVSS /recovery=no
   ```

   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 2.0
   (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 to alternate location by adding the **/INTODB** parameter. For example:

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

What to do next

To restore older, inactive backups by using the Data Protection for Microsoft Exchange Server command-line interface (**TDPEXCC**), specify the **Database Object Name** for the specific backup that you want to restore, when you issue the **restore** command.

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** optional 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
```

Recovering data by using cmdlets

To start a full Microsoft Exchange Server database recovery from a virtual machine by using the cmdlets, complete the following steps.

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
   ```

Verification that Microsoft Exchange Server volumes are not excluded during virtual machines backups

Virtual machine virtual disks must contain the volumes that contain the Microsoft Exchange Server databases that are not excluded from the Data Protection for VMware backup processing.

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

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 virtual machine disks 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.

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 wanted 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. Enter the statements in the correct order to achieve the wanted goal.

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
```

Tivoli Storage Manager file space information

Data Protection for VMware backups are stored under the node name of the vSphere datacenter (for example, *datacenter10*).

This 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:
```

Chapter 6. Protection of Microsoft SQL Server data hosted in VMware environments

As many workloads are being virtualized, the methods that are deployed to protect those applications are evolving to take advantage of the virtualized infrastructure. Take the example of Microsoft SQL Servers that are deployed in VMware ESXi virtual guest machines.

Data protection products today enable you to not only take application-consistent backups of virtual machines that are hosting Microsoft SQL Server databases but also enable you to recover individual Microsoft SQL Server databases from the backup of the virtual machine image.

One of the key requirements that must be considered for any data protection solution is the recovery point objectives (RPO). RPO is the time granularity to which you can recover a Microsoft SQL Server database. One potential solution is to take virtual machine backups on a frequent basis so that the data protection product can provide the necessary recovery points (since the recovery point of a virtual machine level backup is at the point of the backup). Even with the efficiencies of change block tracking and data deduplication, this approach can become prohibitive if only in the cost of creating and deleting virtual machine snapshots. On the contrary, most traditional in-guest data protection methods can provide the appropriate recovery point objectives but these in-guest methods lose the efficiencies that are introduced by backup at the virtual machine level.

The goal of this paper is to provide guidance on how to deploy IBM Tivoli Storage Manager for Virtual Environments: Data Protection for VMware and Tivoli Storage FlashCopy Manager with Data Protection for Microsoft SQL Server in a manner that preserves the backup efficiencies that are offered by backing up data at a virtual machine level but also providing more granular recovery points by deploying complementary in-guest backup methods.

The information that is provided in the subsequent sections assumes that you installed and completed the initial configuration tasks necessary to start the following products:

- Tivoli Storage Manager for Virtual Environments: Data Protection for VMware, V7.1.2 and later (which includes the Tivoli Storage Manager client)
- Tivoli Storage FlashCopy Manager with Data Protection for Microsoft SQL Server, V4.1.2 and later

Installing and configuring for Microsoft SQL Server data protection in a VMware environment

When you install these software offerings, no specific instructions are needed to protect Microsoft SQL Server workloads that are running in a VMware ESXi virtual guest machine.

About this task

Follow the installation and configuration instructions that are provided with each software package. You do not need to follow a specific order when you install and configure your environment.

For example, you can install Data Protection for VMware before or after you install Data Protection for Microsoft SQL Server.

The following configuration tasks are specific to the configuration options that you must protect Microsoft SQL Server workloads that are running in a VMware ESXi virtual guest machine. These options can be set after you complete the initial configuration.

Before you configure to protect Microsoft SQL Server workloads that run in a VMware ESXi virtual guest machine, complete this checklist:

- Verify that no other products (other than the documented use of Data Protection for Microsoft SQL Server) taking Microsoft SQL Server backups (other than `COPY` type) as loss of recoverability to wanted recovery points might result.
- Verify that there are policies to keep sufficient versions of Microsoft SQL Server logs and virtual machine backups.
- Microsoft SQL Server databases and logs must be hosted on VMware virtual disks; this data cannot be hosted on raw device mapped (RDM) disks in physical compatibility mode, independent disks, or on disks that are attached directly to the guest by using iSCSI.
- Microsoft SQL Server databases must be on a single server and cannot be participating in any type of clustering, for example, failover clusters, AlwaysOn Availability Groups or AlwaysOn Failover Cluster instances.

Procedure

1. Configure Data Protection for VMware to protect Microsoft SQL Server databases.
2. Verify that Data Protection for VMware is configured to enable the restore of individual Microsoft SQL Server databases.
3. Configure Data Protection for Microsoft SQL Server to complete Microsoft SQL Server log backups and restore individual Microsoft SQL Server databases from a virtual machine backup.

What to do next

The information that follows might not exactly apply to your environment. You can adjust your configuration for your environment. 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 display name of *vm_sql10* and the Microsoft Windows machine 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 is configured as the VSS requestor node and is using the node name *sql10*.

Summary:

Machine name
> SQL10

VSS requestor node name
> SQL10

Data Protection for Microsoft SQL Server node name
> sql10_SQL

Virtual machine
> vm_sql10

Data mover node names
> datamover10 and datamover20

Datacenter node name
> datacenter10

VM file space
> \VMFULL-vm_sql10

Configuring Data Protection for VMware

By default, 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 in a consistent state.

About this task

To recover only select 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, Data Protection for VMware must be configured to obtain this information from the virtual machine during the backup task.

Complete the following steps to configure Data Protection for VMware to protect Microsoft Exchange workloads. Before you complete these steps, the options file must be configured for Data Protection for VMware and contain the required parameter: *vmchost*

Procedure

1. Configure Data Protection for VMware to preserve the Microsoft VSS metadata (also known as manifest data) information during a virtual machine backup for systems that are hosting Microsoft Exchange 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. The information is going to be used by Data Protection for Microsoft SQL Server at recovery time. Example: `INCLUDE.VMTSMVSS vm_display_name OPTions=KEEPSqllog` If `OPTions KEEPSqllog` is specified in an `INCLUDE.VMTSMVSS` statement, this parameter prevents SQL Server logs from being truncated when a data mover node backs up a VM that runs a SQL Server. Specifying this parameter allows the SQL Server administrator to manually manage (backup and possibly truncate) the SQL Server logs, so they can be preserved as needed and be used to restore SQL Server transactions to a specific checkpoint, after the VM is restored.

When this option is specified, the SQL Server log is not truncated. Tivoli Storage Manager does not back up the SQL Server log files. The SQL Server administrator must back up the log files so they can be applied after the database is restored.

c. Verify that the VMDKs that host the Microsoft SQL Server database are not being excluded from the virtual machine backup operation. Repeat this step 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 interface:

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

This command stores the guest virtual machine credentials encrypted on the system that hosts the data mover.

What to do next

(Optional) You can verify the virtual machine backup configuration, including that the VMDKs are being included. In addition, you can view other parameters by issuing the backup command with the preview option by using the backup-archive client command-line interface. The following command sample is available.

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

To run a virtual machine backup, you can also use the Tivoli Storage Manager scheduler to schedule periodic backups of all of your virtual machines. For verification, you can also back up the virtual machine that is hosting the Microsoft SQL Server by using the backup-archive client command-line interface:

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

Verification of the Data Protection for VMware backup

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

Follow these instructions to verify that the backup includes the correct information.

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

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

In the command output, look for the following details:

```
The Application(s) protected: value specified database-level recovery.
```

Ensure that there are no VMDK status fields for virtual disks that host Microsoft SQL database files that indicate Excluded. This indication tells us that one or more of the VMDKs needed to recover a Microsoft SQL database are not being protected. Sample:

```
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 inside the guest virtual machine.

About this task

Complete the following steps to configure Data Protection for Microsoft SQL Server for data recovery.

Procedure

1. Log on to the virtual machine that hosts the Microsoft SQL Server database (*vm_sql10*).
2. Verify that the following packages are installed:

- Data Protection for VMware recovery agent and license (from the Data Protection for VMware product package)
- Data Protection for Microsoft SQL Server
- Tivoli Storage Manager backup-archive client

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, for example, *datacenter10*.

4. After Data Protection for Microsoft SQL Server is configured, verify that the **Configuring Recovery Agent** rule status indicates `Passed`.

5. Log on to one of the data mover instances and complete the following steps. These steps need to be run from only one instance of a data mover. Do not repeat these steps for all data mover instances.

   a. For the Tivoli Storage Manager backup-archive client that is configured as the VSS requestor node (for example, *sql10*), give access to the virtual machine backups (for example, file space for *vm_sql10*) by using the backup-archive client command-line **set access** command.

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

   This command is run directly from the datacenter node (*datacenter10*). If the current data mover options file (dsm.opt) contains an **ASNODE** entry, create a temporary options file. To create a temporary options file, complete the following steps:

   1) Copy the dsm.opt file to the dsm.setaccess.opt file.

   2) Edit the dsm.setaccess.opt file. For any line that contains **ASNODE**, delete the line.

   3) Edit the dsm.setaccess.opt file to set the **NODENAME** option to the following entry:

      NODENAME DC_NODE

   For example:

      DC_NODE = datacenter10

   b. Enter the following command:

      dsmc set access backup -type=VM vm_name vss_requestor_node
        -optfile=dsm.setaccess.opt

Example

```
dsmc set access backup —type=VM vm_sql01 sql01 —optfile=dsm.setaccess.opt

ANS1148I "Set Access" command successfully completed.

dsmc query access
Node name: datacenter10
Type   Node   User   Path
------ ------ ------ ------
Backup  sql10   *    \VMFULL-vm_sql10\*\*


ANS1148I "Query Access" command completed successfully
```

In this sample, the datacenter node name (for example, *datacenter10*) password is unknown, the Tivoli Storage Manager server administrator must reset the password to run the **set access** command.

Backup management

After the configuration steps are complete, start scheduling backups. Backup management requires that you set up a virtual machine backup schedule and a Microsoft SQL Server log backup schedule.

Scheduling virtual machine backups

To schedule virtual machine backups, complete the following steps:

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.

Results

After the schedule is created, the virtual machines are backed up at the specified time.

Scheduling Microsoft SQL Server backups

After the virtual machine backup schedule is created, create the Microsoft SQL Server backup schedule. The frequency of the backups is determined by the recovery point objectives (RPO).

Before you begin

Ensure that there is a valid full virtual machine backup before backups of Microsoft SQL Server logs can be created.

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 Manage.
3. Under the Manage node, right-click to select **Scheduling** > **Scheduling Wizard**.
4. Open the **Scheduling Wizard** to identify the schedule name and time.
5. Use the command-line interface and SQL Server template to specify the database log backup:

   ```
   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 of one or more Microsoft SQL Server logs, verify that you can query the virtual machine backups and the log 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 are available for restore 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 were backed up using Data Protection for Microsoft SQL Server are listed in this panel with the backup method *Legacy*.

Managing versions of backups

Traditional usage of Data Protection for Microsoft SQL Server manages expiration of log backups by associating them with the full database backup. Because log backups are uniquely named, they do not expire due to version limit nor are they deactivated by another log backup.

Before you begin

Data Protection for Microsoft SQL Server inactivates all active log backup objects for a database when a new full backup of the database is taken. This action also deactivates the prior full database backup. Set the `RETONLY` value in the management class that is used for log backups to match the `RETEXTRA` parameter that is used for full database backups. This mechanism of deactivating logs when the prior full backup is deactivated together with the management class guidance ensures that log backups are retained on the Tivoli Storage Manager server only if the full database backup with which they are associated are retained.

To achieve the objectives of this document, the 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. Explicit deactivation of all active log backups for all databases on the Microsoft SQL Server that is protected by Data Protection for Microsoft SQL Server can be achieved by issuing the Data Protection for Microsoft SQL Server `inactivate` command.

One major difference between scheduling log deactivation explicitly and implicit deactivation that is completed at the time of a traditional full database backup is that explicit log deactivation are completed independently of the success or failure of the virtual machine backup. A simple way to consistently manage backup object retention in this case is to use time-based retention policies.

About this task

For example, if you want to retain your Microsoft SQL Server backups for 30 days, complete the following steps.

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.

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
   ```

   Use the following include options to 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:

   ```
   INCLUDE *:\...\*log management_class_name
   INCLUDE *:\...\log\..\* management_class_name
   ```

3. Schedule the following Data Protection for Microsoft SQL Server command to run daily. For example:

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

Results

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.

The scheduled **inactivate** and **log backup** commands are associated with Data Protection for Microsoft SQL Server running inside the virtual machine while the scheduled virtual machine backups are associated with the Data Protection for VMware client.

Data restoring and recovery

After backups are complete, you can recover the data based on your recovery point objectives (RPO).

The recovery procedure contains the following steps:

1. Restoration of a full backup of the Microsoft SQL database from the Data Protection for VMware backup by using the norecovery option to specify that roll back does not occur.

2. Restoration and application of log backups to recover the database to the wanted point in time.

If you restore the entire virtual machine, the Microsoft SQL Server databases are restored and recovered to the point of the virtual machine backup and you cannot

restore and recover any log backups that were created after that point. If you want to restore and recover any log backups that were created after the virtual machine backup, you follow all the steps in this document to restore and recover the individual database and log backups.

Restoring database backups from a virtual machine backup

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

About this task

To start a full Microsoft database recovery from a virtual machine by using the Data Protection for Microsoft SQL Server graphical user interface, complete the following steps:

Procedure

1. From Microsoft Management (MMC), in the navigation window, from Protect and Recover, select a Microsoft SQL Server.
2. Click the **Recover** tab. All backups, including all database backups from a virtual machine backup, are listed.
3. Click restore options to show all options and change the **AutoSelect** and **RunRecovery** options to False.
4. Select the appropriate full database backup to restore.
5. In the Actions pane, click **Restore**.

Restoring Microsoft SQL Server log backups

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

Procedure

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

Recovering data by using the command-line interface

To start a full Microsoft SQL Server database recovery from a virtual machine by using the command-line interface, complete the following step:

Procedure

1. Issue the **query** command to find the database full backups and log 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 0.0

...

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. Issue the database restore command with the `norecovery` option. For example:

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

   The following sample output results when you issue the command with 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 0.0
   (C) Copyright IBM Corporation 1997, 2013. 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. Issue the command to restore the logs after the full database restore completed successfully. For example, to restore all logs based on previous 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 0.0
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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)
```

Results

To restore older, inactive backups by using the Data Protection for Microsoft SQL
Server command-line interface (**TDPSQLC**), specify the **Database Object Name** for
the specific backup that you want to restore, when you issue the **restore**
command.

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** optional parameter of the **TDPSQLC restore**
command, where *objectname* is the **Database Object Name**. For example:
```
tdpsqlc restore db44 /object=20140311131051 /backupdestination=tsm
 /backupmethod=vmvss
```

Recovery of a Microsoft SQL database to an alternative location on the virtual
machine is not supported.

Sample script for validating full virtual machine backups are available

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 0.0
(C) Copyright IBM Corporation 1997, 2013. 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.

Verification that Microsoft SQL Server volumes are not excluded during virtual machines backups

To preserve the backup efficiencies that are offered by backing up data at a virtual machine level and provide more granular recovery points by deploying appropriate in-guest backup methods, the virtual machine virtual disks need to contain the volumes that contain the Microsoft SQL Server databases that are not excluded from the Data Protection for VMware backup processing.

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

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 virtual machine disks that are hosting volumes that contain Microsoft SQL Server files, file space, database, log, and indexes.

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.

Verify that no statements exclude `vm_sql10_2.vmdk` from your 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 wanted 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. Enter the statements in the correct order to achieve the wanted goal.

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
```

Handling of relocated, new, or deleted database and logs files

The Tivoli Storage Manager backup solution of Data Protection for VMware and Data Protection for Microsoft SQL Server works collaboratively to properly handle database and log files that are relocated, created, or deleted after a virtual machine backup.

When you restore the backups, use the following guidelines:

- The full database restore from the Data Protection for VMware backup restores all files that existed at the time of the backup to their original location.
- If database or log files are relocated during the backup cycle, Data Protection for Microsoft SQL Server restore and recovery processing places the files in their original locations.
- If any new database or log files are created during the backup cycle, Data Protection for Microsoft SQL Server restore and recovery processing re-creates the new files.
- If any database or log files are deleted during the backup cycle, Data Protection for Microsoft SQL Server restore and recovery processing removes those files.

Consider the following example:

1. Data Protection for VMware backs up virtual machine *vm_sql10* that includes Microsoft SQL Server database *moose* at time *t1*; the Microsoft SQL Server database consists of the following files at time *t1*.
   - C:\sqldbs\moose\moose.mdf
   - C:\sqldbs\moose\moose_log.ldf
2. The database administrator decides to relocate the database *moose* at time *t2* to the following location:
   - E:\sqldbs\moose\moose.mdf
   - F:\sqldbs\moose\moose_log.ldf
3. The database administrator decides to add two new files to database *moose* at time *t3* such that the database is now made up 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. Data Protection for Microsoft SQL Server takes a log backup at time *t4*.
5. At time *t5*, the database admin must restore the entire *moose* database.
   - Restore the full database from the Data Protection for VMware backup with **runrecovery**=false.
   - Restore and apply the log backup that is taken at time *t4*.
   - The resulting *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

In this example, the full virtual machine restore placed the files to their original location. Applying the log backup restored the files that were added after the relocation.

Tivoli Storage Manager file space information

Data Protection for VMware backups are stored under the node name of the vSphere datacenter (for example, *datacenter10*).

This 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:
```

Chapter 7. Protecting data

You can back up and restore your Microsoft Exchange Server or Microsoft SQL Server data by using Microsoft Management Console (MMC) or the command-line interface. If required, you can manage your installations remotely.

Starting Microsoft Management Console

After you complete the configuration process, start Microsoft Management Console (MMC) to protect your Exchange or SQL Server data.

Before you begin

If you try to use FlashCopy Manager for Microsoft Exchange Server or FlashCopy Manager for Microsoft SQL Server before you complete the configuration process, the software does not function correctly.

About this task

FlashCopy Manager for Microsoft Exchange Server and FlashCopy Manager for Microsoft SQL Server software is displayed in MMC as a plug-in. MMC uses a navigation tree to organize the computer data that is registered. Each computer icon that is followed by the word *Dashboard* represents a physical computer.

When you register a computer, information about the computer is collected and stored. Password information is encrypted and stored separately. The computers that are registered are tracked with a globally unique identifier (GUID). The GUID is used when you back up and restore data.

You can create groups of computers. These groups consolidate information when you view the dashboard, prepare reports, and run group commands. By default, the computers in a group are selected when you complete tasks for the group, but you can select more computers in the tree to include in an operation.

Procedure

To start MMC, click **Start** > **All Programs** > **Tivoli FlashCopy Manager** > **FlashCopy Manager Management Console**.

Starting the Tivoli Storage FlashCopy Manager command-line interface

You can start the Tivoli Storage FlashCopy Manager for Exchange Server or Tivoli Storage FlashCopy Manager for SQL Server command-line interface by using a Windows command prompt with administrative privileges. Alternatively, you can start the command-line interface from Microsoft Management Console (MMC).

Procedure

1. Start MMC.
2. In the tree view, select the computer node where you want to run the commands.
3. Expand the **Protect and Recover Data** node.
4. In the tree view, select an Exchange Server node.

5. Click the **Automate** tab. An integrated command line is available in the task window. You can use the interface to enter PowerShell cmdlets or command-line interface commands. The output is displayed in the main window.

6. From the drop-down list, change **PowerShell** to **Command Line**.

Getting help for Tivoli Storage FlashCopy Manager commands

By issuing the `help` command at the command prompt, you can display a complete list of Data Protection for SQL Server and Data Protection for Microsoft Exchange Server commands, and associated parameters.

Procedure

Use the following methods at the command prompt.

Table 15. Tivoli Storage FlashCopy Manager help commands

If you are using:	Issue this command
Data Protection for SQL Server	**tdpsqlc ?***command_name* where command_name is the name of the Tivoli Storage FlashCopy Manager command. For example: `tdpsqlc ? restore full`
Data Protection for Microsoft Exchange Server	**tdpexcc ?***command_name* where command_name is the name of the Tivoli Storage FlashCopy Manager command. For example: `tdpexcc ? backup`

Determining managed storage capacity

You can track the capacity of managed storage assets. This information can be useful when you are calculating storage requirements for license renewal.

About this task

Typically, the capacity that is used by server data differs from the capacity of the volume that contains that data. For example, a set of databases might require a capacity of 1 GB and be on a 10 GB volume. When a snapshot of the volume is created, the Tivoli Storage FlashCopy Manager managed capacity measurement is 10 GB.

Procedure

1. From Microsoft Management Console (MMC), select an Exchange Server, SQL Server, or file system instance.
2. On the **Protect**, **Recover**, or **Automate** tab, in the Actions pane, click **Properties**.
3. Select **Managed Capacity** from the list of available property pages. The managed capacity is calculated and displayed.
4. To view a list of the volumes that contain backups and their respective managed capacities, click **Show Details**.

Protecting Exchange Server data

With Tivoli Storage FlashCopy Manager for Exchange Server, you can back up and restore Microsoft Exchange Server databases. You can create point-in-time snapshots of a Microsoft Exchange Server.

Related tasks:

Ensuring successful MAPI connections

If you use Exchange Server 2013, use the MAPI Settings property page to verify that the user mailbox is online. You can also view and update the MAPI registry key that enables Tivoli Storage FlashCopy Manager to connect to the Exchange Server.

Before you begin

Ensure that the correct version of Microsoft Exchange Server MAPI Client and Collaboration Data Objects is installed on the Exchange Server.

About this task

For mailbox restore operations to succeed in Exchange Server 2013 environments, the MAPI client must use Remote Procedure Call over HTTPS (RPC over HTTPS), also known as Outlook Anywhere. You cannot use RPC over TCP.

Procedure

1. From Microsoft Management Console (MMC), select an Exchange Server instance.
2. On the **Protect** tab, click **Properties** in the Action pane.
3. Select **MAPI Settings** from the list of property pages.
4. Verify that the following information is correct in the Exchange Server environment:
   - The mailbox alias field shows the mailbox that you are logged in to. Verify that you can open the mailbox in Microsoft Outlook or Outlook Web Access (OWA).
   - The **Exchange Profile Server** field shows the correct mailbox endpoint on the Exchange Server that has the Client Access Server (CAS) role. Verify that you can open the target mailbox in Outlook or OWA.
5. Edit the registry key only if the default value is incorrect. Use one of the following methods.
   - Enter the registry key value in the `RpcHttpProxyMap_TSM` field.
   - Enter the `Domain` field value and enable or disable the **Use HTTPS authentication** check box. When you change either of these values, the values of the registry key automatically updates in the `RpcHttpProxyMap_TSM` field.

   Consider that the values that you enter override the registry key that is in the `HKEY_CURRENT_USER\Software\Microsoft\Windows NT\Current Version\Windows Messaging Subsystem` directory. If you modify the registry incorrectly, the connection to the Exchange Server might fail.

   RpcHttpProxyMap_TSM

Change the registry key values to reflect the correct domain, endpoint, and Remote Procedure Call (RPC) authentication methods for your environment. By default, the following format is used.

`Domain=Proxy Server,RpcHttpAuthenticationMethod,`
`RpcAuthenticationMethod,IgnoreSslCert`

For example:

`companyname.local=https://exchange.companyname.com,ntlm,ntlm,false`

where:

- *Domain* value is the domain suffix of the personalized server ID, for example, `companyname.local`. Specify any domain or a substring of a domain, or the asterisk (*) and question mark (?) wildcard characters, for example, `*.companyname.local`.
- *Proxy Server* value is the RPC proxy server that has the Client Access Server (CAS) role. Specify the fully qualified domain name (FQDN) of the RPC proxy server. Precede the FQDN by `http://` for an HTTP connection, or `https://` for an HTTPS connection. For example, `https://exchange.companyname.com`
- *RpcHttpAuthenticationMethod* value is the method that is used to authenticate RPC-over-HTTP connections. Specify NTLM, `Basic`, `Negotiate`, or `WinNT`.
- *RpcAuthenticationMethod* value is the method that is used to authenticate RPC-over-TCP connections. Specify NTLM, `Negotiate`, `WinNT`, `Anonymous`, or `None`.
- *IgnoreSslCert* value indicates whether the Exchange Server validates SSL certificates. For the Exchange Server to ignore invalid certificates, specify `False`.

Domain
Change the domain name to reflect the correct domain if for example, you have multiple domains, or the default domain value is incorrect. To match all domains, enter the asterisk (*) wildcard character. When you change this domain value, the *Domain* value of the registry key automatically updates in the `RpcHttpProxyMap_TSM` field.

Use HTTPS authentication
Select this check box if RPC-over-HTTPS is enabled for the Exchange Server that is hosting the MAPI profile. Otherwise, clear this check box to ensure that HTTP authentication is used for RPC-over-HTTP connections. When you change this authentication value, the *RpcAuthenticationMethod* value of the registry key automatically updates in the `RpcHttpProxyMap_TSM` field.

Related tasks:

Related reference:

Backing up Exchange Server data by using VSS

By using Microsoft Volume Shadow Copy Service (VSS), you can back up Exchange Server data and mount the backup if required.

Before you begin

- You must have a VSS provider that is configured for your environment.
- If you back up Exchange Server databases in a Database Availability Group (DAG) environment, and you want to back up your databases to a common node, ensure that you set up a DAG node name (DAGNODE).

  Tip: Backing up DAG databases to a common node is helpful when you want to manage backups with a single policy, regardless of which DAG server completes the backup.
  You can set up the DAG node name in the **DAG Node** field in the TSM Node Names page of the Tivoli Storage Manager configuration wizard, or in the **Back up DAG databases to common node** field in the General properties page for your Exchange Server workload.

Procedure

1. Start Microsoft Management Console (MMC) and click **Exchange Server** in the tree view.
2. On the **Protect** tab, select one or more databases to back up. Alternatively, click the **Protect Data** shortcut in the start page of MMC.
   a. Filter the list of available databases in the results pane by entering a keyword in the **Search** field.
   b. If you are running backup operations in an Exchange Server DAG environment, you can back up an active database copy or passive database copy. View the copy status in the **DAG Status** column on the **Protect** tab.
3. Specify the backup options. If the backup options are not displayed, click **Show Backup Options**.
   - To use offloaded backups, set the **Offload** option to **True**.

     If you use offloaded backups, specify the remote client node,`RemoteDSMAGENTNode`, that runs the VSS offloaded backups on a remote computer. This option applies only to the Tivoli Storage Manager configuration.
   - Select **Skip Integrity Check** and choose one of the following options.

     Table 16. Options for integrity checking

Task	Action
Bypass integrity checking for all database and log files	Select **Yes**
Run integrity checking to verify that all database and log files are free of errors	Select **No** This option is the default.
Bypass integrity checking for database files only if at least two valid copies of a database (one active and one passive copy) exist in a DAG	Select **Skip Database Check If Healthy**
Bypass integrity checking for database and log files only if at least two valid copies of a database (one active and one passive copy) exist in a DAG	Select **Skip Database And Log Check If Healthy**

- If you are scheduling the backup of databases in an Exchange Server DAG, set the **Minimum Backup Interval** value to the minimum amount of time, in minutes, before a backup of another copy of the same DAG database can begin. The default value is *0*, which means that you can back up the database again immediately after a backup operation of that database is complete. The time of the last database backup is determined from the Exchange Server and not the Tivoli Storage Manager server.

  This option specifies that only one database copy can be backed up within a time frame. This option prevents all members in a DAG from backing up the database. Specify this setting for tasks that are scheduled to run when you click **Run Scheduled**.

- If you are scheduling the backup of databases in an Exchange Server DAG, set **PreferDAGPassive** option to **True** to skip the backup for an active database copy unless no valid passive copy is available. If no valid passive copy is available, the backup is created from the valid active database copy.

  Specify this setting for tasks that are scheduled to run when you click **Run Scheduled**.

4. Optional: Choose a mode for the current task:
   - **Run Interactively**: Click this item to run the current task interactively. This selection is the default.
   - **Run Scheduled**: Click this item to convert the current action into a scheduled task. When you select this item, the schedule wizard runs the command that is required to complete the task.

5. To create the backup, select the backup action in the Actions pane. You can run a full, copy, incremental, or differential backup with the VSS backup method.

Related concepts:

"Offloaded VSS backups" on page 6

Related tasks:

"Restoring a Database Availability Group database backup" on page 162

Mounting Exchange Server backups

To see a copy of Exchange Server data from a specific point in time, mount a snapshot backup.

About this task

A copy of data from a specific time is also known as a point-in-time consistent copy or online snapshot.

Restriction: You cannot use Microsoft Management Console (MMC) to mount a backup to a different server. To mount a VSS snapshot to a remote server, enter the `mount backup` command at the command line.

Procedure

1. Start MMC.
2. Click **Recover Data** in the welcome page of MMC.
3. In the Actions pane on the **Recover** tab, click **Mount Backup**.
4. Either type the path to the empty NTFS or ReFS folder where you want to mount the backup or browse to find the path. Click **OK**. On the **Recover** tab, the backup that you mounted is displayed.

5. In the Actions pane, select the **Explore** and **Unmount Backup** tasks for the backup that you mounted.

Related reference:

"Mount backup command" on page 248

Deleting Exchange Server backups

You can remove an Exchange Server backup that you created with the VSS backup method. Use this procedure only for deletions that are outside the scope of your standard policy management deletions.

Before you begin

Typically, backups are deleted automatically based on user-defined policy management settings. This procedure is necessary only if you must delete backups that are outside the scope of Tivoli Storage FlashCopy Manager policy definitions.

If you back up Exchange Server Database Availability Group (DAG) databases to Tivoli Storage Manager, you can delete the database backup from the DAG member to a local shadow volume only from the Exchange Server on which the backup is created.

If you delete a remotely-mounted backup, the snapshots and the relationship between the source and target volumes on the storage device are also deleted. However, the target volume that is imported and mounted might continue to exist. In addition, the target volume might not be available to the server where the remote mount occurred. The operations to the target volume depend on the VSS hardware provider and the storage device implementation.

After the maximum number of remotely-mounted backup versions or the maximum number of days to retain a backup is exceeded, the associated backup is expired and deleted.

Procedure

1. Start Microsoft Management Console (MMC).
2. Click **Recover Data** in the welcome page of MMC.
3. On the **Recover** tab for the Exchange Server instance, select **View: Database Restore**. In the Results pane, browse to and select one or more database backups to delete.
4. In the Actions pane, click **Delete Backup**. While a backup is being deleted, two tasks are displayed in the task window to show that the deletion is in progress, and that the view is being refreshed.

Related tasks:

"Mounting VSS snapshots to remote servers" on page 201

Setting data restore options in Microsoft Management Console

To optimize the data restore process for your environment, modify the default options that are available in Microsoft Management Console (MMC).

Procedure

1. On the Recover tab, select **Database Restore**.
2. Click **Show Restore Options** to modify the default restore options as follows:

Table 17. Database restore options

Option	Action
Auto Select	For this option, specify a value of Yes (default) to quickly select the backup objects to restore. With automatic selection, when you select the most recent backup to restore, all associated backups are automatically selected, up to the previous full backup. When you specify Yes, the automatic selection option applies to full backups, differential backups, and incremental backups, but not to copy backups. This option affects backups in the following ways: • When you click a differential backup, the associated full backup is also selected. • When you click an incremental backup, the associated full backup and all associated earlier incremental backups are also selected. • For VSS backup, automatically selects all databases that were backed up together to the local destination. However, databases that were backed up to Tivoli Storage Manager are not automatically selected.
From Server	Enter the name of the server where the original backup is completed. The default value the local server.

Table 17. Database restore options (continued)

Option	Action
Instant Restore	For this option, specify a value of **Yes** to use volume-level snapshot restore (instant restore) for local VSS backups if the backup exists on SAN-attached volumes. Specify a value of **No** to disable instant restore, which bypasses volume-level copy and uses file-level copy (fast restore) to restore the files from a local VSS backup. The default value is **Yes**, which uses volume-level snapshot restore if it is available. This option is available for VSS operations only. If you use instant restore for SAN Volume Controller earlier than version 5.1 or DS8000, ensure that any previous background copies that involve the volumes that are being restored are completed before you initiate the instant restore. This option is automatically set to **No** during *restore into* operations. In an instant restore operation, files on the destination file system are overwritten. Incremental and differential backups are automatically converted to file-level restores. An instant restore operation requires that the drive or volume where the mailbox database is located must be available. Any other process or application must not have access to the drive or volume.
Mount Databases After Restore	For this option, specify a value of **Yes** to automatically mount databases after backups are recovered. **No** is the default value for this option.
Replay Restored AND Current Logs	For this option, specify a value of **Yes** to replay any transaction log entries that are displayed in the current active transaction log. This log includes both current and restored logs. **Yes** is the default value for this option. This option is not supported for instant restore.
Replay Restored Logs ONLY	For this option, specify a value of **Yes** to replay only restored logs. **No** is the default value for this option.
Run Recovery	For this option, specify a value of **Yes** to complete the database restore operation. Recovery cannot run if the databases are not online.

Restoring an Exchange Server database

You can use the *restore into* function to restore an Exchange Server database backup to a recovery database or alternate database. You can also restore a DAG active or passive database copy to a recovery database or alternate database.

Before you begin

- Ensure that your system is set up to use the DAG node name (DAGNODE). You can specify the DAG node name in the **DAG Node** field in the TSM Node Names page of the Tivoli Storage Manager configuration wizard, or in the **Back up DAG databases to common node** field in the General properties page for your Exchange Server workload.

- You can restore mailboxes with the Mailbox Restore Browser or Mailbox Restore functions. In some rare cases, however, you might want to restore data into a recovery database or alternate database. Ensure that a recovery database or alternate database exists before you attempt the restore operation.

About this task

- For database backups in the Exchange Server Database Availability Group (DAG) environment, you can restore a database regardless of which DAG member the database was backed up from because all database copies are backed up by using a single DAG node. Local backups must be restored on the node where the backup was completed.

  In a stand-alone environment, you cannot back up a database from one DAG member and restore it to a different DAG member. Backups of the same database are managed with the same policy, regardless of whether the database is active or passive at the time of the backup.

- Running any type of *restore into* function automatically disables VSS instant restore capability.

  When you restore a database by using instant restore processing, data that exists in the destination database is overwritten, and is no longer available after restore processing is complete. When you restore a database by using the *restore into* function, you restore data to an alternate target destination. The data is not restored to the original source destination. For the restore operation to be successful, the alternate target destination must be of equal or greater size as the original source volume.

- To complete restore operations, backups must be taken on the same version of Exchange Server.

- You cannot use multiple instances of Data Protection for Microsoft Exchange Server to restore databases into the recovery database simultaneously.

Procedure

1. From Microsoft Management Console (MMC), click **Recover Data** in the welcome page.
2. On the **Recover** tab for the Exchange Server instance, select **View: Database Restore**. In the Results pane, browse to the databases that are available to restore. The following options are available:

Table 18. Database restore selection options

Option	Action
Filter	Use the filter options to narrow the list of databases in the result pane. 1. Click **Show Filter Options** and **Add Row**. 2. In the **Column Name** field, click the down arrow and select an item to filter. For database backups in the Exchange Server DAG environment, the **Server** column displays the name of the DAG and the server that created the backup in this format: DAGNAME\SERVERNAME where DAGNAME is the name of the DAG, and SERVERNAME is the name of the server (DAG member) that created the backup. For example: TSMDAG4\AVOCADO To filter by **Backup Date**, click the default date and time to edit the table cell. To change the date, click the arrow button that is displayed 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 click **Select All**, all rows that reflect the filter specifications are selected. 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**.
Backups	Select the database to restore. You can click **Active Backups** to show only active backups, or click **All Backups** to show both active and inactive backups.
Search	In the **Search** field, enter a keyword to filter the list of available databases.
Refresh	Click **Refresh** to update the view with your changes.

If you applied a filter, the objects on the server that match the filter or search criteria are listed in the **Recover** tab. The status area indicates the number of items that match the criteria *n* of *x* displayed, where *n* equals the number of objects that match the filter criteria, and *x* is the number of objects that are retrieved from the server. For example, 5 of 20 displayed. If you specify refresh options to further narrow your results, and click **Refresh** again, the

objects on the server that match the filtered and refresh options are displayed. Each time that you click **Refresh**, another query is run against the Tivoli Storage Manager server.

3. On the **Recover** tab for the Exchange Server instance, select one or more backups to restore. If the **Auto Select** option is set to **Yes** in the Restore Options view, more backups that are necessary to restore the most recent backup are selected for you. If you do not want the additional selections that are made for you, set **Auto Select** to **No**.

4. Verify the restore options. If the restore options are not displayed, click **Show Restore Options**.

5. Optional: Choose a mode for the current task:
   - **Run Interactively**: Click this item to run the current task interactively. This selection is the default.
   - **Run Scheduled**: Click this item to convert the current action into a scheduled task. When you select this item, the schedule wizard runs the command that is required to complete the task.

6. Start the restore operation:
   - To restore the backup, right-click that backup name and select **Restore**. Alternatively, in the Actions pane, click **Restore**.
   - To restore the backup into another location, right-click and select **Restore Into** to specify a target location for the restore operation. A dialog window opens where you can specify the destination database.

     Select the name of a database into which a VSS backup is restored.

   VSS instant restore is available only for full or copy type backups that are on the disk devices that support this type of restore operation. During the VSS instant restore operation, the drive or volume where the database is located must not be accessed by any other process or application.

Restoring a Database Availability Group database backup

You can restore a replicated database copy in a Database Availability Group (DAG).

About this task

You can use Exchange Management Shell commands, which are provided in parentheses.

Procedure

1. Make the database that you want to restore active (**Move-ActiveMailboxDatabase**).

2. Suspend replication of all passive copies of the database (**Suspend-MailboxDatabaseCopy**).

3. Unmount the active mailbox database (**Dismount-Database**).

4. If you are using VSS instant restore, and the **During Instant Restore, automatically stop and restart necessary Microsoft Exchange services** option is not selected in Microsoft Management Console (MMC), or the **STOPSERVICESONIR** parameter is set to NO at the command line, stop the following replication services on all copies of the database.
   - (DAG environments only) Exchange Replication Service
   - (Exchange Server 2013 only) Exchange Search Host Controller Service

5. Restore the database and logs by using the command line or MMC.

Restriction: The database must not be mounted automatically after the restore. If you use MMC, ensure that the **Mount Databases After Restore** option is set to **No** in the Restore pane. If you use the command line, set the **/mountdatabases** parameter to NO.

However, if the **During Instant Restore, automatically stop and restart necessary Microsoft Exchange services** option is selected, or the **STOPSERVICESONIR** parameter is set to YES, you can set the **Mount Databases After Restore** option to YES.

6. If the service is stopped, start the replication service before you mount the active mailbox database. Otherwise, the database mount fails (**Mount-Database**).

7. Verify the health of the database before you update or reseed to replicated database copies. (**Get-MailboxDatabaseCopyStatus**)

8. Update or reseed all replicas (**Update-MailboxDatabaseCopy**). By completing this step, you can help to avoid potential transaction log synchronization problems that might arise if replication is resumed directly.

9. Move the active database to the server that you want (**Move-ActiveMailboxDatabase**).

Restoring mailbox data

Tivoli Storage FlashCopy Manager 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.

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 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, Tivoli Storage FlashCopy Manager 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 tree view.

2. On the **Recover** tab for the Exchange Server instance, change the selected view to **Mailbox Restore**.

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, 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.

4. Optional: By default, the entire mailbox is restored. You can use the **Item-Level Mailbox Filters** to identify individual messages to restore:

   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 that is displayed 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 19. 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 is 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**.
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. Click one of the following **Restore** actions to complete the restore operation.

Table 20. Restore options

Task	Action
Restore Mail to Original Location	Select this action to restore mail items to their location at the time of backup.
Restore Mail to Alternate Location	Select this action to restore the mail items to a different mailbox. A window is displayed in which you can specify the mailbox.

Table 20. Restore options (continued)

Task	Action
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.
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 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 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.

Table 20. Restore options (continued)

Task	Action
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.
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.

Related concepts:

"Security requirements for Microsoft Exchange Server data" on page 18

Related tasks:

"Deleting mailbox history information" on page 225

"Troubleshooting mailbox restore errors" on page 222

Related reference:

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, Tivoli Storage FlashCopy Manager 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 tree, select **Exchange Server**.
3. On the Recover panel, click **View** > **Mailbox Restore Browser**. The Select Source Mailbox to Restore window opens.
4. In the Select Source window, specify the mailbox that you want to restore. Choose from the actions in the following table:

Table 21. 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 point in 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**.
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.

Table 21. Selecting mailboxes to restore (continued)

Task	Action
Browse all databases in a backup	1. From the drop-down list, select **Browse Databases**. 2. From the list of mailbox databases that are displayed, 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 22. Previewing and filtering mail 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**.
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. Tivoli Storage FlashCopy Manager 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 23. 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.
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. Tivoli Storage FlashCopy Manager 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 Tivoli Storage FlashCopy Manager, 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.

Related tasks:

"Troubleshooting mailbox restore errors" on page 222

Restoring mailboxes directly from Exchange Server database files

If the backup database (EDB) file and log files are available on the disk of a supported Microsoft Exchange Server, you can restore an individual mailbox directly from the EDB file.

Before you begin

If you use Tivoli Storage Manager for Virtual Environments software, review the following guidelines before you restore the mailbox:

- You can use Tivoli Storage Manager for Virtual Environments to back up an Exchange Server in a virtual machine. For more information about the `backup` command, see Backup command (http://www.ibm.com/support/knowledgecenter/SS8TDQ_7.1.2/com.ibm.itsm.ve.doc/r_ve_vmcli_backup.html).
- To restore mailboxes from the backups that are created by Tivoli Storage Manager for Virtual Environments, mount the virtual volumes that contain the EDB file and log files with read/write access. You can obtain read/write access by clearing the **Mount virtual volume as read only** check box.
- If the log files are on a different volume than the EDB file, mount the volume that contains the log files on an unused drive letter. In this way, you can apply the transaction logs to the EDB file.

If you use Tivoli Storage FlashCopy Manager for Exchange Server to back up the Exchange Server, you can enter the following command to restore the database files to a local disk:

```
tdpexcc RESTOREFILES
```

Verify that read/write access to the EDB file is available.

Verify that the Exchange Server transaction log files are available.

Procedure

1. From the Exchange Server, start Tivoli Storage FlashCopy Manager.
2. After you log on to Tivoli Storage FlashCopy Manager, in the navigation area, select the **Exchange Server** node and the **Recover** tab. The Mailbox Restore Browser view opens.
3. In the Actions pane, click **Open EDB File on Disk**.
4. In the window, enter or browse to the location of the EDB file.

5. In the window, enter or browse to the location of the log file directory. Specifying a path to the log file directory is not required. However, the amount of time that is necessary to complete the restore operation is reduced when you provide the log file directory path.

6. Click **OK**. The EDB file is opened and the mailboxes are displayed.

7. Select the mailbox that you want to restore and the type of restore that you want to complete. For example, you can restore a mailbox to a PST file.

8. When the restore operation is complete, click **Close Mailbox to Restore**. You are prompted to save or delete the recovery database folder.

Restoring a deleted mailbox or items from a deleted mailbox

You can use the FlashCopy Manager for Microsoft Exchange Server mailbox restore operation to restore a mailbox (or items from a mailbox) that was deleted from an Exchange Server.

Before you begin

If you are restoring a mailbox that was deleted or re-created since the time of the backup, you must specify a temporary mailbox with enough storage capacity to accommodate all the mailbox items that you are restoring. Specify a temporary mailbox by setting the **/TEMPMAILBOXAlias** parameter. If the **/TEMPMAILBOXAlias** parameter is not set, the default mailbox is the logon user mailbox.

Procedure

Decide where the mailbox data from the deleted mailbox is to be restored. With the mailbox restore operation, you have three options as follows:

1. 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**.

2. Restore the deleted mailbox data into an active alternative mailbox in an online Exchange Server.

3. Restore the deleted mailbox data into an Exchange Server personal folders (.pst) file.

Restoring mailboxes on remote systems

The process of restoring mailboxes on a remote system with the Mailbox Restore Browser feature differs from restore operations on local systems.

Before you begin

- For a typical mailbox restore task, you must install the FlashCopy Manager for Microsoft Exchange Server package on the local and remote systems. The correct version of Microsoft Exchange Server MAPI Client and Collaboration Data Objects must also be installed.

- To restore mailboxes on a remote system with Mailbox Restore Browser, the local and remote systems must be in the same domain. The following procedure assumes that you installed the latest version of Tivoli Storage FlashCopy

Manager, configured the Exchange Server workload, and have a Windows PowerShell remote connection. At least one mailbox needs to be stored in a database on the remote system.

- After you complete the installation of software on the local and remote systems, verify that the remote system is available and that you can connect to it. Verify that the database with the mailbox you want to restore is backed up successfully. You can use Microsoft Management Console (MMC) to go to the remote system where you want to restore mailboxes.

Procedure

1. From MMC, expand the navigation tree to the remote system.
2. From the Protect and Recover Data tree node, select the **Exchange Server**.
3. In the main window, on the **Recover** tab, click **View** > **Mailbox Restore Browser**.
4. Select the mailbox that you want to restore. Click **OK**. The mailbox is displayed in the Source Mailbox tree view.
5. Click **Restore Mail to Original Mailbox**.

Protecting SQL Server data

With Tivoli Storage FlashCopy Manager for SQL Server, you can back up and restore Microsoft SQL Server databases in a stand-alone configuration. You can create point-in-time snapshots of your Microsoft SQL Server and store the data locally on the server that is running the backup.

Related concepts:

"Protection of Microsoft SQL Server data" on page 28

Related tasks:

Chapter 4, "Configuring," on page 75

Verifying the integrity of legacy databases by using the checksum option

With Tivoli Storage FlashCopy Manager, you can verify the integrity of legacy database backups by setting a checksum option.

About this task

A *checksum* is a value that is calculated and written in the data page header of the database data file. When a data file is read again, the checksum value is recalculated. Checksum processing validates the values in a file or configuration for unexpected changes. Values are verified between the current state and the baseline state.

Restriction: Checksum integrity checking is available only with legacy backups on SQL Server.

Procedure

1. Open the General Properties window in Microsoft Management Console (MMC).
2. Select **Compute SQL Server checksum for legacy backup**.

   If you select this option, all legacy backups are checked by default. You can override this setting to set integrity checking for a particular backup. For example, if you bypassed integrity checking on all backups, you can set

integrating checking on a particular legacy backup by selecting the **SQL Checksum** backup option on the **Protect** tab for the SQL instance. You can also issue the `SQLCHECKSum` option with the **backup** command on the command line to temporarily enable or disable the checksum option.

Results

When you select the **Compute SQL Server checksum for legacy backup** check box, the setting is written to the Tivoli Storage FlashCopy Manager for SQL Server preferences file, `tdpsql.cfg`, and is applied to all legacy backup operations. If you clear the check box, integrity checking does not apply to any legacy database backup.

Related tasks:

"Creating legacy backups of SQL Server databases" on page 177

Creating VSS backups of SQL Server databases

You can back up standard SQL Server databases or availability databases by using Microsoft Volume Shadow Copy Service (VSS).

Before you begin

To manage local VSS backups or to run offloaded backups to Tivoli Storage Manager server storage, ensure that Tivoli Storage FlashCopy Manager is configured in your environment.

If you use VSS to back up data to a Tivoli Storage Manager server, Tivoli Storage FlashCopy Manager is not required.

About this task

On SQL Server 2012 and later versions, you can back up availability databases in an AlwaysOn Availability Group (AAG) regardless of which availability replica is used for the backup operation.

Restriction: When you complete a full backup of a secondary replica in an AAG, only a copyfull backup of that database is created.

To back up availability databases, ensure that Tivoli Storage FlashCopy Manager is configured to use an AlwaysOn node. Additionally, specify the AlwaysOn node in the **AlwaysOn Node** field in the TSM Node Names page of the Tivoli Storage Manager Configuration Wizard. If you change the **AlwaysOn node name** field in the AlwaysOn Node properties page for your SQL workload, you must run the Tivoli Storage Manager Configuration Wizard to complete the reconfiguration of the name.

If you do not want to use the Tivoli Storage Manager Configuration Wizard to register the node on the Tivoli Storage Manager server, you can use the Tivoli Storage Manager `register node` command.

Procedure

1. Start Microsoft Management Console (MMC).
2. If you plan to use offloaded backups, and your environment is configured for use with a Tivoli Storage Manager server, specify a value in the **Remote DSMAGENT Node name** field.

a. Select the **SQL Server** instance in the tree view, and click **Properties** in the Actions pane.

b. Select the VSS Backup property page. If the **Remote DSMAGENT Node name** is blank, enter a node name.

An offloaded backup uses another system (specified with the **Remote DSMAGENT Node name** parameter) to move SQL data to Tivoli Storage Manager server storage. Offloaded backups can reduce the load on network, I/O, and processor resources during backup processing.

3. On the **Protect** tab of an SQL instance, select an option for viewing databases.

Table 24. Database backup views

Task	Action
View a list of SQL databases that are available for a backup operation	Click **View: Databases**.
View a list of SQL Server 2012 and later version availability databases that are available for a backup operation	Click **Standard Databases**. Information about the availability databases in an availability group is displayed, including the replica role, synchronization state, and space and log usage. Toggle the **Standard Databases** / **Availability Databases** button for the respective database views.

Refine the list of available databases in the results pane by entering a keyword in the **Search** field. Then, select the databases to back up.

4. Verify the backup options. If the backup options are not displayed, click **Show Backup Options**. If you want to use offloaded backups, select **Yes** in the **Offload** field.

5. In the Actions pane, click **Backup Method** and select **VSS**.

6. In the Actions pane, click **Backup Destination** and select a location to store the backup:

Local Click this item to store the database backups to local shadow volumes only.

TSM Click this item to store the database backups on Tivoli Storage Manager server storage only. Do not select this option if you are using Tivoli Storage FlashCopy Manager in a stand-alone configuration.

Both Click this item to store the database backups to Tivoli Storage Manager server storage and local shadow volumes. Do not select this option if you do not have a Tivoli Storage FlashCopy Manager license or if you are using Tivoli Storage FlashCopy Manager in a stand-alone configuration.

7. Optional: Choose a mode for the current task:

- **Run Interactively**: Click this item to run the current task interactively. This selection is the default.
- **Run Scheduled**: Click this item to convert the current action into a scheduled task. When you select this item, the schedule wizard runs the command that is required to complete the task.

8. To start the backup operation, in the Actions pane, take one of the following actions:

a. Click **Full Backup.** Alternatively, right-click a database and select the backup action that you require from the menu.

b. Click **Copy-Only Full Backup**. A copy-only full backup is independent of the sequence of SQL Server backups, and is not used as a base for a differential backup. A differential backup is not associated with the copy-full backup, but is associated with the previous full backup that completed. You might use a copy-only full backup as a special purpose backup that does not affect backup and restore operations, and retain such a backup for longer than conventional backups.

9. Review the status of the backup operation by clicking **Task List** in the results pane. Click **Task Details** to view detailed status information.

Results

During backup processing, Data Protection for SQL Server bypasses database snapshots and databases that are in offline, mirroring, and restoring states.

What to do next

To determine which databases backups are bypassed during backup processing, review the tdpsql.log in the directory where Tivoli Storage FlashCopy Manager is installed.

Creating legacy backups of SQL Server databases

You can create a legacy backup of your standard SQL databases by using Microsoft Management Console (MMC). You can also use the legacy method to back up availability databases with SQL Server 2012 and later versions.

Before you begin

- To run a legacy backup, ensure that the Tivoli Storage FlashCopy Manager for SQL Server license file is installed.
- On SQL Server 2012 and later versions, you can also back up availability databases in an AlwaysOn Availability Group (AAG) regardless of which availability replica is used for the backup operation. To back up availability databases, ensure that Tivoli Storage FlashCopy Manager is configured to use an AlwaysOn node. Additionally, specify the AlwaysOn node in the **AlwaysOn Node** field in the TSM Node Names page of the Tivoli Storage Manager Configuration Wizard.

Procedure

1. Start MMC.
2. Select the **SQL Server** instance in the tree view.
3. On the **Protect** tab of an SQL instance, select an option for viewing databases.

Table 25. Database backup views

Task	Action
View a list of SQL databases that are available for a backup operation	Click **View: Databases**.

Table 25. Database backup views (continued)

Task	Action
View a list of SQL Server 2012 and later version availability databases that are available for a backup operation	Click **Standard Databases**. Information about the availability databases in an availability group is displayed, including the replica role, synchronization state, and space and log usage. Toggle the **Standard Databases** / **Availability Databases** button for the respective database views.

Refine the list of available databases in the results pane by entering a keyword in the **Search** field.

4. Verify the backup options. If the backup options are not displayed, click **Show Backup Options**.

Table 26. Database backup options

Option	Action
Data Stripes	Use this option to specify the number of data stripes to use in a backup or restore operation. The *numstripes* variable can be in the range 1 - 64. The default value is 1. When you use a multiple stripes number for legacy backups, and set the **Verify Only** parameter to **Yes** to restore the legacy backup, the number of stripes for legacy restore must be equal or greater than the number of stripes for the legacy backup.
Estimated Database % Change	Use this option to specify the estimated percentage of the database that changed since its last full database backup. The default value is 20. This estimate is useful because SQL Server does not provide a way to determine the size of a differential backup, and because the Tivoli Storage Manager server requires an accurate size estimate to efficiently allocate space and place objects. The Tivoli Storage Manager server uses this value to determine whether there is enough space in the primary storage pool to contain the backup.
Estimated Log % Change	Use this option to specify the estimated percentage of an SQL database that changed due to non-logged operations since the last log backup. The default value is 0.

Table 26. Database backup options (continued)

Option	Action
Truncate Logs	Use this option to specify whether to dispose of entries that you no longer need in the SQL database transaction log after you back up the log. The default value is **Yes**. In general, you do not want to truncate the log when you rebuild a corrupted database. This option enables the server to back up the transaction log but does not affect the data. All transaction log entries are written from the time of the last log backup to the point of database corruption. If you do not truncate the transaction log, you might be able to back up the transaction log of a damaged, suspect, or unrecoverable SQL Server database.
Back Up Tail-Log	Use this option to store log records that are not backed up. By storing these records, also known as the *tail of the log*, the log chain is kept intact. Before you can recover an SQL Server database to the last point in time, you must back up the tail of the transaction log. The tail-log backup is the last backup of interest for the database recovery plan.
SQL Server Checksum	Use this option to verify the integrity of a legacy database backup. Integrity checking is a process that validates the values in a file or configuration for unexpected changes. Values are verified between the current state and the baseline state. In the Performance Properties window of MMC, you can enable or disable the checksum option for all your legacy databases at once. You can override the global setting, and temporarily enable or disable the checksum option for a database backup, by setting this **SQL Checksum** option to **Yes** or **No**.

5. In the Actions pane, click **Backup Method** and select **Legacy**.

6. Optional: Choose a mode for the current task:
   - **Run Interactively**: Click this item to run the current task interactively. This selection is the default.
   - **Run Scheduled**: Click this item to convert the current action into a scheduled task. When you select this item, the schedule wizard runs the command that is required to complete the task.

7. To start the backup operation, in the Actions pane, take one of the folllowing actions:
   - **Full Backup**

- **Copy-Only Full Backup**
- **Differential Backup to TSM**
- **Log Backup to TSM**

8. Review the status of the backup operation by clicking **Task List** in the results pane. Click **Task Details** to view detailed status information.

What to do next

- To determine which databases backups are bypassed during backup processing, review the tdpsql.log in the directory where Tivoli Storage FlashCopy Manager is installed. Tivoli Storage FlashCopy Manager bypasses database snapshots and databases that are in offline, mirroring, and restoring states.
- To determine whether the checksum option is applied to a legacy database backup, enter the `tdpsqlc query tsm *` command on the command line, or the equivalent `Get-DpSqlBackup` cmdlet.

Related tasks:

"Verifying the integrity of legacy databases by using the checksum option" on page 174

Deleting SQL Server backups

You can remove an SQL Server backup that you created with the VSS backup method. Complete this task only if necessary.

Before you begin

Typically, backups are deleted automatically based on user-defined policy management settings. This procedure is necessary only if you must delete backups that are outside the scope of Tivoli Storage FlashCopy Manager policy definitions.

If you delete a remotely-mounted backup, the snapshots and the relationship between the source and target volumes on the storage device are also deleted. However, the target volume that is imported and mounted might continue to exist. In addition, the target volume might not be available to the server where the remote mount occurred. The operations to the target volume depend on the VSS hardware provider and the storage device implementation.

After the maximum number of remotely-mounted backup versions or the maximum number of days to retain a backup is exceeded, the associated backup is expired and deleted.

Procedure

1. Start Microsoft Management Console (MMC).
2. Click **Recover Data** > **SQL** in the Management window.
3. On the **Recover** tab for the SQL instance, select **View: Database Restore**. In the results pane, browse to and select one or more database backups to delete. The corresponding node type, for example, DP or AlwaysOn, must also be selected.
4. In the Actions pane, click **Delete backup**. When a backup is deleted, two tasks display in the task window to show you that the deletion is in progress, and that the view is being refreshed.

Related tasks:

"Mounting VSS snapshots to remote servers" on page 201

Deactivating legacy backups of SQL Server databases

Tivoli Storage Manager deactivates an SQL database backup as a part of Tivoli Storage Manager policy management. Data backups are typically deactivated when an SQL database is deleted from the SQL Server as part of the scheduled backup processing.

Before you begin

The SQL database that you want to deactivate must be a legacy backup. You cannot use this procedure to deactivate VSS backups. The **Delete** action is available in the Actions pane when you select a VSS backup from the **Recover** view.

About this task

For legacy backups, you can deactivate any or all of the following backup object types: full, differential, copyfull, log, file, group, or set. You can also deactivate any object or object type that is older than a specified number of days.

When you deactivate database backups, any existing backups on Tivoli Storage Manager server are subject to be deleted, as specified by the `verdeleted` setting.

When automatic processing is insufficient, the `inactivate` function explicitly deactivates one or more active data backups on the Tivoli Storage Manager server.

Procedure

1. Under the **Protect and Recover Data** node in the tree view, select the SQL Server.
2. Open the **Recover** view to see the status of the backup. Active backups are displayed.
3. Select the database backup that you want to deactivate, and in the Actions pane, click **Inactivate**.
4. To view the results, take one of the following actions:
   - To display the database that you made inactive, click **All Backups** on the toolbar.
   - To display only active database backups, click **Active Backups** on the toolbar.

Setting single-user mode for restore operations

You might have to start an SQL Server instance in single-user mode during certain restore operations. For example, you might use single-user mode when you are restoring a damaged master database or a system database, or when you are changing server configuration options.

Before you begin

Restriction:
- You cannot restore SQL databases that are in use. By placing SQL databases to be restored in single-user mode, you can avoid system attempts to restore those databases.
- Microsoft Management Console (MMC) cannot connect to a SQL Server instance that is started in single-user mode. If you want to use MMC when the SQL Server instance is in single-user mode, you must use the command-line interface, `tdpsqlc.exe`, to restore the master database.

Procedure

1. To determine which users are using the databases, use the SQL stored procedure, SP_WHO.
2. To force users off the SQL database and set the SQL Server to single-user mode, issue this TRANSACT-SQL command.

   ```
   ALTER DATABASE DBNAME SET SINGLE_USER
   WITH ROLLBACK AFTER N SECONDS
   ```

3. To start the SQL Server in single-user mode, use the -m SQL SERVER startup option.
4. To return the database to multiple-user mode, issue this TRANSACT-SQL command.

   ```
   ALTER DATABASE DBNAME SET MULTI_USER
   ```

Setting data restore options in Microsoft Management Console

To optimize the data restore process for your environment, modify the default options that are available in Microsoft Management Console (MMC).

Procedure

1. On the Recover tab, select **Database Restore**.
2. Click **Show Restore Options** to modify the default restore options as follows:

Table 27. Database restore options

Option	Action
Auto Select	For this option, specify a value of Yes (default) to quickly select the backup objects to restore. With automatic selection, when you select the most recent backup to restore, all associated backups are automatically selected, up to the previous full backup. This option affects backups in the following ways: • When you click a differential backup, the associated full backup is also selected. • When you click a log backup, the associated full backup and all associated earlier differential or log backups are also selected.
Performance	
Stripes	For this option, specify the number of data stripes to use in a restore operation. A maximum of 64 data stripes is allowed. The default value is 1. The value that you enter must correspond to the value that you set for SQL buffers. **Restriction:** This restore option is available only with legacy backups. When you use a multiple stripes number for legacy backups, and set the **Verify Only** parameter to **Yes** to restore the legacy backup, the number of stripes for legacy restore must be equal to or greater than the number of stripes for the legacy backup.
Restore Behavior	

Table 27. Database restore options (continued)

Option	Action
Database Owner Only	To mark a database for owner use only, set this value to **Yes**. The default value is **No**, which specifies not to mark the database for owner use. **Restriction:** This restore option is only available with legacy backups.
Replace	To replace a database during a restore operation, set this value to **Yes**. The default value is **No**, which specifies not to replace databases. **Restriction:** This restore option is available only with legacy backups.
Recovery	Use this option to restore data to an SQL database that is not on a standby SQL Server. The default value is **Yes**. • Select **Yes** when you run a sequence of restore operations to an SQL database and the current restore operation is the final one in the sequence, or when it is the only restore operation. • Select **No** when you run a sequence of restore operations to an SQL database and the current restore operation is not the final one in the sequence. Select **No** for all restore operations in the sequence except for the final one.
Stand By Undo File Name	For this option, specify a value of Yes to change the target SQL database to to a standby SQL database. The default value is **No**. This option is available for full, differential, and log backup types. When you specify this option for a database, it applies to all backup objects for that database. Similarly, when you remove this option for a backup object, the option is removed for all backup objects.
Verify Only	Before you restore a legacy database backup, set this option to **Yes** to verify that the database backup is complete and can be read. The default value is **No**. **Restriction:** This restore option is available only for legacy database backups. When you use a multiple stripes number for legacy backups, and set the **Verify Only** parameter to **Yes** to restore the legacy backup, the number of stripes for legacy restore must be equal to or greater than the number of stripes for the legacy backup.
Source Server	

Table 27. Database restore options (continued)

Option	Action
From SQL Server	Use this option to specify the name of the SQL Server that the backup is created from. To specify the name of a virtual environment SQL Server, change **IncludeTsmVM** to Yes to view Virtual Environment backup SQL databases in the **Databases** view. The backup method is listed as TSMVM to distinguish these databases from the other databases that are listed.
Tape	
Wait for Tape Mounts for Restore	Use this option to specify whether the Data Protection for Microsoft Exchange Server restore operation waits for the Tivoli Storage Manager server to mount removable media such as tapes or other sequential device media. The default value is **Yes**.
Wait for Tape Mounts for File Information	When you query Tivoli Storage Manager for file information, use this option to specify whether Data Protection for Microsoft Exchange Server waits for the Tivoli Storage Manager server to mount removable media. The default value is **Yes**. **Restriction:** This restore option is available only with legacy backups.
VSS	
Instant Restore	For this option, specify a value of **Yes** to use volume-level snapshot restore (instant restore) for local VSS backups if the backup exists on SAN-attached volumes. Specify a value of **No** to disable instant restore, which bypasses volume-level copy and uses file-level copy (fast restore) to restore the files from a local VSS backup. The default value is **Yes**, which uses volume-level snapshot restore if it is available. This option is available for VSS operations only. If you use instant restore for SAN Volume Controller earlier than version 5.1 or DS8000, ensure that any previous background copies that involve the volumes that are being restored are completed before you initiate the instant restore. In an instant restore operation, files on the destination file system are overwritten. Incremental and differential backups are automatically converted to file-level restores. An instant restore operation requires that the drive or volume where the mailbox database is located must be available. Any other process or application must not have access to the drive or volume.

Related tasks:
"Troubleshooting VSS backup and restore operations" on page 220

Restoring SQL Server data

You can restore SQL Server databases or parts of databases only from `full`, `copyfull`, `differential`, and `log` backups. You can also restore availability databases with SQL Server 2012 and later versions.

About this task

Attention: When you restore a database, existing data is overwritten by the restored data and is no longer available after the restore operation is complete.

* The Regional settings, which are defined in the Regional property page, must match the date format that is defined for the Microsoft SQL Server.
* You can use VSS to run backup operations of type full or copyfull. You can apply legacy differential and legacy log backups after a full VSS backup is restored.
    - When Virtual Environment restore operations are configured from the Tivoli Storage Manager server, you can restore and view these databases from the Recover tab.
    - You can also restore availability databases that you backed up with the `AlwaysOn` node with SQL Server 2012 and later versions. Backups of availability databases can be restored to any availability replica in an availability group.
    - You can restore a legacy database backup that is verified as valid and complete with the **Verify Only** option in Microsoft Management Console (MMC), or with the **/VERIFYOnly** option of the **restore** command on the command line.

Procedure

1. Start MMC.
2. Select the **SQL Server** instance in the tree.
3. On the **Recover** tab for the SQL instance, specify the type of SQL data to restore.

   Table 28. Database backup views

Task	Action
View a list of SQL databases that are available for a restore operation	Click **View: Databases**.
View a list of SQL database backup files that are available for a restore operation	Click **View: Files**.
View a list of SQL Server 2012 and later version availability databases that are available for a restore operation	Click **DP Node Backups** to show AlwaysOn node backups. Toggle the **DP Node Backups** / **AlwaysOn Node Backups** button for the respective database views.

4. On the **Recover** tab of an SQL Server instance, select an option for viewing databases. In the Results pane, browse to the databases that are available to restore. The following options are available:

   Table 29. Database restore selection options

Option	Action
Search	Enter a keyword in the **Search** field to refine and filter the list of databases.

Table 29. Database restore selection options (continued)

Option	Action
Filter	Use the filter options to refine and filter the list of databases. 1. Click **Show Filter Options** and **Add Row**. 2. In the **Column Name** field, click the down arrow and select an item to filter. 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**.
Backups	Select the database to restore. You can click **Active Backups** to show only active backups, or click **All Backups** to show both active and inactive backups.
Refresh	Click **Refresh** to update the view with your changes.

If you applied a filter, the objects on the server that match the filter or search criteria are listed on the **Recover** tab. The status area indicates the number of items that match the criteria `n of x displayed`, where `n` equals the number of objects that match the filter criteria, and `x` is the number of objects that are retrieved from the server. For example, "`5 of 20 displayed`." If you specify refresh options to further narrow your results, and click **Refresh** again, the objects on the server that match the filtered and refresh options are displayed. Each time that you click **Refresh**, another query is run against the Tivoli Storage Manager server.

5. Verify the options for the restore operation. If the restore options are not displayed, click **Show Restore Options**.

6. Optional: Choose a mode for the current task:
   - **Run Interactively**: Click this item to run the current task interactively. This selection is the default.
   - **Run Scheduled**: Click this item to convert the current action into a scheduled task. When you select this item, the schedule wizard runs the command that is required to complete the task.

7. To start the restore operation, in the Actions pane, take one of the following actions:
   - Click **Restore**.
   - Click **Restore VerifyOnly**. The **Restore VerifyOnly** task is available only if all the selected database backups are legacy backups.

8. To view the status of the restore operation, click **Task List** in the results pane. Click **Task Details** to view detailed status information.

Related tasks:

"Setting data restore options in Microsoft Management Console" on page 182

"Troubleshooting VSS backup and restore operations" on page 220

Related reference:

"Regional" on page 108

Restoring an SQL Server database to an alternate instance

By using Microsoft Management Console (MMC), you can restore an SQL Server database backup to an alternate SQL Server instance or database. You can also restore availability databases to an alternate location on any availability replica in an availability group.

Before you begin

Install Tivoli Storage FlashCopy Manager for SQL Server on both systems. Unlike legacy backups, you cannot restore VSS backups to an SQL Server that has a different name.

About this task

You can also restore availability databases that you backed up with the `AlwaysOn` node with SQL Server 2012 and later versions. Backups of availability databases can be restored to any availability replica in an availability group.

You can select only one database at a time when you restore a database to an alternate location.

Procedure

1. Copy the Tivoli Storage FlashCopy Manager for SQL Server options file (`dsm.opt`) from the source system to the target system.

   Source system
   > The system from which the original backup (to be restored) is created.

   Target system
   > The alternate system to which the backup is to be restored.

   By default, the `dsm.opt` file is in the `C:\Program Files\Tivoli\TSM\TDPSql` directory. If you specified a value of `generate` for the **passwordaccess** parameter in the `dsm.opt` file, you might need to reset the password for this node on the Tivoli Storage Manager server.

2. Start MMC.

3. On the **Recover** tab for the SQL instance, specify the type of SQL data to restore.

   Table 30. Database backup views

Task	Action
View a list of SQL databases that are available for a restore operation	Click **All Backups**.
View a list of SQL Server 2012 and later version availability databases that are available for a restore operation	Click **DP Node Backups** to show AlwaysOn node backups. Toggle the **DP Node Backups** / **AlwaysOn Node Backups** button for the respective database views.

4. Verify the options for the restore operation. If the restore options are not displayed, click **Show Restore Options**.

   a. Ensure that **Wait for Tape Mounts for Restore** is set to **Yes**.

   b. Ensure that **Wait for Tape Mounts for File Information** is set to **Yes**.

c. If the database to be restored is to replace an existing database on the target system, click **Replace**.

d. Use the **Instant Restore** option to turn Instant Restore on or off. Click **Yes** to use Instant Restore. Click **No** to disable Instant Restore if you want to use Fast Restore.

   Attention: Instant Restore operations overwrite all files on the destination file system.

5. To start the backup operation, in the Actions pane, take one of the following actions:

   a. Click **Restore to Alternate Location**.

   b. Click **Restore VerifyOnly to Alternate Location**. The **Restore VerifyOnly to Alternate Location** task is available only if all the selected database backups are legacy backups.

6. In the **Restore Into** section of the Alternate Location Restore Settings window, click **Restore to new database**, and specify a target SQL Server instance name and target database name to restore a backup object to. VSS backups cannot be restored into an SQL Server that has a different name.

   Attention: Any type of **Restore Into** processing automatically disables VSS instant restore.

7. In the **Relocate** section of the window, filter the restore processing operations.

   Table 31. Database backup views

Task	Action
Specify new destination locations in which to restore backed up SQL databases, logs, and FILESTREAM files (SQL Server 2008 or later versions)	Click **Restore all files into one directory**.
Restore the log files into a location that is different from where the SQL database and other related files are restored	Select **Relocate logs into** and specify a new path in the text entry field.
Restore FILESTREAM files (SQL Server 2008 or later versions) into a location that is different from where the SQL database and logs are restored	Select **Relocate other files into**, and specify a new path in the text entry field.
Restore one or more individual SQL database, log, and FILESTREAM files	Click **Relocate files individually**, and click **Browse** to open a folder selection window. Select a folder or create a new folder, and click **OK**. The path of the selected files entries is set to use the folder. This option is available for legacy backups only.

   Restriction: You cannot relocate database files and logs with a partial restore operation in MMC. You must use the command-line interface to complete a partial restore operation that requires these parameters.

8. Click **Restore** to close the Alternate Location Restore Settings window and begin the restore.

9. To view the status of the restore operation, click **Task List** in the lower half of the results pane. Click **Task Details** to view detailed status information.

What to do next

You can restore a legacy database backup that is verified as valid and complete with the **Verify Only** option in MMC, or with the **/VERIFYOnly** option of the **restore** command on the command line.

Restoring the master database

A damaged master database can prevent the SQL Server from starting and cause other errors. To protect your data if the master database is damaged, you must routinely complete a full database backup of the master database (`msdb`).

Before you begin

- Set single-user mode for restore operations.
- Always keep an up-to-date backup of your master database because the master database contains the system catalog. The system catalog contains important information about the SQL Server configuration.
- Ensure that you back up the master database after any changes that update system tables. For example, back up the master database after you use any of these statements:
  – ALTER DATABASE
  – CREATE DATABASE
  – DISK INIT
  – DISK RESIZE
  – DISK MIRROR
  – DISK UNMIRROR
  – DISK REMIRROR
  – Various DBCC options such as SHRINKDB
  – System-stored procedure, such as sp_dropremotelogin, sp_addumpdevice, sp_dropdevice, sp_addlogin, sp_droplogin, sp_addserver, sp_dropserver, sp_addremotelogin

About this task

If the master database is damaged while a server instance is running, fix the damaged database by restoring a recent full master database backup. If a server instance cannot start because the master database is damaged, the master database must be rebuilt. When you rebuild a master database, all system databases revert to their original state.

Restriction: Microsoft Management Console cannot connect to an SQL Server instance that is started in single-user mode. When the SQL Server instance is in single-user mode, you must use the command-line interface, `tdpsqlc.exe` to restore the master database.

Procedure

1. Click **Start** > **All Programs** > **Tivoli Storage Manager** > **Data Protection for Microsoft SQL Server** > **SQL Client - Command Line**.
2. Start the SQL Server in single-user mode.
3. Use Data Protection for SQL Server to restore the master database. When the master database finishes the restoration process, the SQL Server shuts down and an error message is displayed. The message indicates that the connection to the SQL Server is lost. This loss of connection is expected.

4. Restart the database engine to restore SQL Server to the typical multiuser mode.

5. Run the SQL Server setup program to rebuild the master database. When you rebuild the master database, use the same character set and sort order as the master database backup that is to be restored.

6. Manually reapply any changes to the master database that occurred after the date of the database backup that is used to complete the restore operation.

7. Restore the msdb database. During the process of rebuilding the master database, the SQL Server setup program drops, and then re-creates, the msdb database. Therefore, you must restore the msdb database with the master database.

Results

After the master database is restored, you can use MMC to back up and restore individual databases that are operating in single-user mode.

Related concepts:

"Restore operations for the master database" on page 32

Related tasks:

"Setting single-user mode for restore operations" on page 181

"Troubleshooting VSS offline restore of a master database" on page 221

Restoring SQL databases with full-text catalogs and indexes

You can restore SQL Server 2005 and 2008 databases, including their full-text catalogs and full-text indexes.

About this task

When you back up an SQL Server 2005 database and the full-text index is part of a full-text catalog, the full-text catalog has a physical path. In this scenario, the full-text catalog is treated as a database file.

When you back up an SQL Server 2008 database and later data, a full-text catalog is either a logical or virtual object that contains a group of full-text indexes. This full-text catalog does not have a physical path. When you restore a database with SQL Server 2008 and later full-text catalog files, no data is explicitly stored. The file is automatically backed up and restored as part of the filegroup.

Procedure

- To restore a database with the SQL Server 2005 physical full-text catalog file from the command-line interface, use the **/RELocate** and **/TO** parameters. For example:

  ```
  Restore DATABASE full /relocate=database,sysft_docindex,database_log
  /TO={database_dir}\database.mdf,{database_dir}\docindex,
  {database_log_dir}\database_log.ldf
  ```

- To restore a database with the SQL Server 2005 physical full-text catalog file from the GUI, use the **Relocate files individually** option. From the command-line interface, use **/relocate** and **/TO** instead of **/RELOCATEDir**.

Protecting SQL Server data in a Windows Server Core environment

You can use the Tivoli Storage Manager command-line interface to back up and restore SQL data in a Windows Server Core environment.

About this task

The graphical user interface of Tivoli Storage FlashCopy Manager is not available in a Windows Server Core environment.

You can use the **backup** and **restore** commands to protect databases that are stored in a Microsoft SQL Server 2012 or later environment.

Backing up SQL Server databases on Windows Server Core

To back up Microsoft SQL Server 2012 and later version databases, use the **backup** command.

About this task

Use the following procedure to back up SQL Server databases to the Tivoli Storage Manager server, or to take local VSS snapshots.

Procedure

1. To back up all or part of an SQL database on Windows Server Core, enter the following command at the command prompt:

   ```
   tdpsqlc backup database_name backup_type [other_options]
   ```

   where database_name specifies the name of the database, and backup_type specifies the type of backup such as a full backup. You can specify other options, such as the back up method. For example, to create a full legacy backup of SQL databases DB_01 and DB_02, enter the following command:

   ```
   tdpsqlc backup DB_01,DB_02 full /backupmethod=legacy
   ```

   For example, to create a full legacy backup of all databases on the SQL Server, enter the following command:

   ```
   tdpsqlc backup * full /backupmethod=legacy
   ```

2. To back up a file group, enter the following command at the command prompt:

   ```
   tdpsqlc backup database_name file_group
   ```

   where database_name specifies the name of the database, and file group specifies the file group in the database. For example, to back up the filegroup DB_01_group1 that belongs to the DB_01 database, enter the following command:

   ```
   tdpsqlc backup DB_01 Group=DB_01_group1
   ```

Restoring SQL Server databases on Windows Server Core

To restore Microsoft SQL Server 2012 and later version databases, use the **restore** command.

About this task

Use the following procedure to recover all or part of one or more SQL databases.

Procedure

To restore all or part of an SQL database on Windows Server Core, enter the following command at the command prompt:

```
tdpsqlc restore database_name backup_type [other_options]
```

where database_name specifies the name of the database, and backup_type specifies the type of backup such as a full backup. You can specify other options, such as the file group. For example, to create a full database restore of databases DB_01 and DB_02, and to replace the existing databases with the database objects that are recovered from the Tivoli Storage Manager server, enter the following command

```
tdpsqlc restore DB_01 group=DB_01_group1
```

To restore the filegroup DB_01_group1 that belongs to the DB_01 database, enter the following command:

```
tdpsqlc restore DB_01 group=DB_01_group1
```

To restore all the logical files that are in the DB_01 database, enter the following command:

```
tdpsqlc R DB_01 file=*
```

Changing Tivoli Storage FlashCopy Manager configuration values on Windows Server Core

To configure preferences for Tivoli Storage FlashCopy Manager for SQL Server, use the **set** command at the Windows Server Core command prompt.

About this task

The values that you change are saved in the Tivoli Storage FlashCopy Manager configuration file. The default configuration file is tdpsql.cfg.

Procedure

At the command prompt, enter the following command:

```
tdpsqlc set parameter=value [/configfile=filename]
```

where *parameter* is the Tivoli Storage FlashCopy Manager parameter or option for which you want to change the value, and *value* is the new value that you want to specify. **/configfile** is the optional parameter for the configuration file name. If you do not specify the **/configfile** parameter, the default configuration file (tdpsql.cfg) is used.
Examples:

Task   Set the preferred SQL Server in the tdpsql.cfg file.

Command: tdpsqlc set sqlserver=*your_SQL_instance*
/configfile=tdpsql.cfg

Command: `tdpsqlc set fromsqlserver=`*`your_SQL_instance`*
`/configfile=tdpsql.cfg`

Task   Change the name of the Tivoli Storage FlashCopy Manager activity log file to `tdpsql.log`.

Command: `tdpsqlc set logfile=tdpsql.log`

Protecting custom application and file system data

To create VSS snapshot backups of NTFS or ReFS file systems and applications, use Tivoli Storage FlashCopy Manager. When you back up applications and file systems, Tivoli Storage FlashCopy Manager must access the data.

About this task

If permissions must be granted for Tivoli Storage FlashCopy Manager to access the data, see the documentation that is provided with the application and file system.

Related tasks:

"Configuring Tivoli Storage FlashCopy Manager for file system and custom applications in a Microsoft Cluster Server environment" on page 89

Backing up custom application and file system data

You can back up custom application and file system data by using Microsoft Volume Shadow Copy Service (VSS).

Before you begin

Tivoli Storage FlashCopy Manager must be configured to manage VSS snapshots for the custom application or file system. To configure Tivoli Storage FlashCopy Manager for this task, use the Standalone Configuration Wizard. In the wizard, select **File System**.

Alternatively, if you are using Tivoli Storage Manager server, configure integration with the Tivoli Storage Manager server by using the Tivoli Storage Manager wizard.

Procedure

1. Start Microsoft Management Console (MMC).
2. In the tree view, click **Protect and Recover Data** > **File System**.
3. In the **Protect** tab, select the volume names and mount points to back up.

   Tip: Enter a keyword in the **Search** field to refine the list of available volume names and mount points in the results pane.
4. Click **Show Backup Options**. Then, select one of the options and take the appropriate action.

Table 32. Backup options

Option	Action	More information
Optional: For custom applications, specify the presnapshot and postsnapshot batch scripts	Specify the complete path for a `presnapshotcmd` file or `postsnapshotcmd` file to use. These scripts are used to quiesce or stop the application, which is necessary to ensure backup consistency.	A `presnapshotcmd` file is a Windows command file that is run before a snapshot backup is created. For example, the `presnapshotcmd` script can quiesce an application before the snapshot is created. A `postsnapshotcmd` file is a Windows command file that is run after a snapshot backup is created. For example, a `postsnapshotcmd` script can resume an application after the snapshot is created.
To use offloaded backups	Set the **Offload** option. If you intend to use offloaded backups, ensure that the **Remote DSMAGENT Node name** field is complete when you set preferences for the Data Protection properties. If you use the command-line interface to update the configuration for offloaded backups, set the `REMOTEDSMAGENTNODE` parameter. This parameter applies only to VSS backups.	An offloaded backup uses another system to move custom application and file system data to Tivoli Storage Manager server storage. An offloaded backup can reduce the load on the network, I/O, and CPU resources during backup processing.

5. Optional: Choose a mode for the current task:
   - **Run Interactively**: Click this item to run the current task interactively. This selection is the default.
   - **Run Scheduled**: Click this item to convert the current action into a scheduled task. When you select this item, the schedule wizard runs the command that is required to complete the task.
6. In the Actions pane, click **Backup Method** and select **VSS**.
7. In the Actions pane, click **Backup Destination** and specify where to store the backup. These options are available:
   - **Local**
   - **TSM**
   - **Both**
8. In the Actions pane, click **Full Backup**. You can view the backup progress from the Task List and Task Details panes.

Implementing custom application and file system backup scenarios

You might decide to implement different backup strategies that depend on your network traffic requirement and backup schedule. Follow these typical backup scenarios if you want to back up custom application and file system data to local shadow volumes, or create a file-level backup to the Tivoli Storage Manager server.

Creating a VSS snapshot backup to local shadow volumes

You can back up custom application and file system data to local shadow volumes if sufficient storage space is available on the local shadow volumes.

Procedure

1. If you are backing up an application, stop (or suspend) the custom application and file system. To complete this task automatically, use the **fcmcli backup** command and specify the **/presnapshotcmd=** *cmdstring* parameter where the *cmdstring* variable is the command that runs run before the snapshot operation begins.

2. Create the backup by specifying the **fcmcli backup** command. Or, in the Tivoli Storage FlashCopy Manager user interface, click **Full Backup to Local** option in the Action window.

   VSS snapshot backups can also be sent to the Tivoli Storage Manager server storage pools by specifying **BackupDestination TSM**, or BOTH from either the command-line interface (with the **fcmcli backup** command) or Tivoli Storage FlashCopy Manager user interface. The VSS snapshot data is sent to the Tivoli Storage Manager server as an image-level backup.

3. If you are backing up an application, restart or resume the application. To complete this task automatically, use the **fcmcli backup** command and specify the **/postsnapshotcmd=** *cmdstring* parameter where the *cmdstring* variable is the command that runs run after the snapshot operation ends.

Related concepts:

"Microsoft SQL Server backup strategies" on page 28

Related reference:

"Backup examples" on page 363

"Backup optional parameters" on page 361

Creating a file-level backup to the Tivoli Storage Manager server

You can optionally use the Tivoli Storage Manager server backup-archive client to create file-level backups of your file system or custom application data.

Procedure

1. Create a VSS snapshot backup.

2. Mount the VSS snapshot backup.

3. Create a file-level backup to the Tivoli Storage Manager server by issuing a Tivoli Storage Manager backup-archive client command. Use the incremental, selective, or archive command with the snapshotroot option. The snapshotroot option does not provide any facilities to take a volume snapshot, only to manage data that is created by a volume snapshot.

4. Unmount the VSS snapshot backup.

Related tasks:

"Mounting custom application and file system backups" on page 196

"Creating a VSS snapshot backup to local shadow volumes"

Mounting custom application and file system backups

You can mount a snapshot backup to see a point-in-time consistent copy of custom application and file system data.

About this task

Restriction: You cannot use Microsoft Management Console (MMC) to mount a backup to a different server. To mount a VSS snapshot to a remote server, enter the `mount backup` command at the command prompt.

Procedure

1. Start MMC.
2. Click **Recover Data** in the welcome page of MMC.
3. In the Recover tab, go to the Action pane. Click **Mount Backup**.
4. Either type the path to the empty NTFS or ReFS folder where you want to mount the backup or browse to find the path. Click **OK**. On the **Recover** tab, the backup that you mounted is displayed.
5. Use the **Explore** and **Unmount Backup** options in the Actions pane to complete tasks with the backup that you mounted.

Deleting custom application and file system backups

You can remove a custom application or file system VSS backup object that you created with the VSS backup method. Complete this task only if necessary.

Before you begin

Typically, backups are deleted automatically based on user-defined policy management settings. This procedure is necessary only if you need to delete backups that are outside the scope of your standard policy management definitions.

Procedure

1. Start Microsoft Management Console (MMC).
2. From the Management window, click **Protect and Recover Data** > **File System**.
3. On the **Recover** tab, select the volume name or mount point to delete. Be aware that you are not deleting the volume or mount point. You are deleting the backup version of the volume or mount point. To view active and inactive backups, click **All Backups**. To view only active backups, click **Active Backups**.
4. Right-click to select the volume or mount point; then, either click **Delete Backup** in the menu, or click **Delete Backup** in the Actions pane. A confirmation message is displayed.
   - To delete the volume, click **Yes**.
   - To stop the deletion process, click **No**.

   When a backup is deleted, two tasks are displayed in the task window to show that the deletion is in progress, and that the view is being refreshed.

Restoring custom application and file system data

The Tivoli Storage FlashCopy Manager user interface displays information about active and inactive backups. Review this information so that you can select the custom application and file system data to restore.

Procedure

1. Start Microsoft Management Console (MMC).
2. In the Management window, click **Protect and Recover Data** > **File System**.
3. On the **Recover** tab, select an option for viewing databases. In the Results pane, browse to the databases that are available to restore. The following options are available:

Table 33. Database restore selection options

Option	Action
Search	Enter a keyword in the **Search** field to refine and filter the list of databases.
Filter	Use the filter options to refine and filter the list of databases. 1. Click **Show Filter Options** and **Add Row**. 2. In the **Column Name** field, click the down arrow and select an item to filter. 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**.
Backups	Select the database to restore. You can click **Active Backups** to show only active backups, or click **All Backups** to show both active and inactive backups.
Refresh	Click **Refresh** to update the view with your changes.

If you applied a filter, the objects on the server that match the filter or search criteria are listed on the **Recover** tab. The status area indicates the number of items that match the criteria `n of x displayed`, where `n` equals the number of objects that match the filter criteria, and `x` is the number of objects that are retrieved from the server. For example, "`5 of 20 displayed`." If you specify refresh options to further narrow your results, and click **Refresh** again, the objects on the server that match the filtered and refresh options are displayed. Each time that you click **Refresh**, another query is run against the Tivoli Storage Manager server.

4. Verify the restore options. If the restore options are not displayed, click **Show Restore Options**. Set a value for the following options:

FromServer
> If the backup is not displayed in the results pane, enter the name of the server where the original backup was completed. The default value is the current server.

InstantRestore

To use VSS Instant Restore, enter `Yes`. This option applies only to snapshots that are on a disk system that supports Instant Restore operations. Enter `No` to use VSS Fast Restore (file-level copy).

5. Optional: Choose a mode for the current task:
   - **Run Interactively**: Click this item to run the current task interactively. This selection is the default.
   - **Run Scheduled**: Click this item to convert the current action into a scheduled task. When you select this item, the schedule wizard runs the command that is required to complete the task.

6. In the Actions pane, complete one of the following actions to begin the restore operation.
   a. Click **Restore** to restore the selected volumes or mount points to their original location.
   b. Click **Restore Into**. When the backup is stored on only the Tivoli Storage Manager server, Tivoli Storage FlashCopy Manager provides the **Restore Into** option. When the backup is stored on only the local disk, the **Restore Into** option is not available.

      After you select **Restore Into**, in the window that is displayed, specify a target location for the restore operation. The target location must be a drive letter or mount point. The size of the target location must be equal to the size of the original volume.
   c. Click **Restore to Point-in-Time** to specify a point in time in the past from which to restore the last version of a volume or mount point. When this action is selected, you are prompted to provide the following information:
      - **PITDate**

        Enter the date to establish a point in time to restore a specific version of your custom application or file system backup. Objects that are backed up on or before the date and time that you specify, and that are not deleted before the date and time you specify, are processed. Backup versions that you created after this date and time are ignored.
      - **PITTime**

        Use this option with the **PITDate** option to establish a point in time to restore a specific version of your custom application or file system backup. Objects that are backed up on or before the date and time that you specify, and objects that are not deleted before the date and time that you specify, are processed. Backup versions that you created after this date and time are ignored. This option is ignored if you do not specify **PITDate** option.

7. To view the status of the restore operation, click **Task List** in the lower half of the results pane. Click **Task Details** to view detailed status information.

Implementing custom application and file system restore scenarios

You might decide to implement different restore strategies that depend on your network traffic requirement and restore schedule. Follow these typical restore scenarios if you want to restore the entire volume from local shadow volumes, restore individual files from a snapshot or from Tivoli Storage Manager server, or restore the entire volume from VSS image sent to Tivoli Storage Manager server pools.

Restoring the entire volume from a custom application and file system data VSS backup on local shadow volumes

You can use a VSS instant restore operation to restore a local VSS backup and overwrite the entire volume data. You can use a VSS fast restore operation to restore a local VSS backup that copies the files on the volume at the time of the backup.

Procedure

1. If the custom application is running, stop or suspend it. For a file system, close any open handles to that file system.
2. Restore from a VSS backup by specifying the **fcmcli restore** command with the **/INSTANTRestore=yes** parameter (VSS instant restore) or **/instantrestore=no** parameter (VSS fast restore).

   Examples:

   Task   By using a VSS instant restore operation, restore the local VSS backup and overwrite the entire volume data without a prompt.

        Command: `fcmcli.exe restore G: /INSTANTRestore=Yes /NOPROMPT`

   Task   By using a VSS fast restore operation, restore the local VSS backup that copies the files on the volume at the time of the backup.

        Command: `fcmcli.exe restore G: /INSTANTRestore=No`

3. Complete any actions that are required to achieve a correct state of the custom application and file system files.
4. Restart or resume the custom application.

Restoring individual files from a custom application and file system data VSS backup on local shadow volumes

You can restore files from a VSS backup of custom applications and file system data. The backup is stored on a local shadow volume.

Procedure

1. Mount the VSS backup.

   Task   Mount the local VSS backup from drive letter `G:` to drive letter `M:`

        Command: `fcmcli.exe mount backup G:=M:`

2. If the custom application is running, stop or suspend it.
3. Issue the Windows `COPY` or `XCOPY` command or use a tool, for example, Windows Explorer, to copy the files from the VSS backup to your preferred location.

   Task   Issue the Windows COPY command to copy the `config.txt` file from drive letter `M:` to drive letter `G::`

        Command: `copy M:\config.txt G:\config.txt /y`

4. Complete any actions that are required to achieve a correct state of the custom application.
5. Restart or resume the custom application.
6. Unmount the VSS backup.

Restoring the image backup of a custom application or file system data from Tivoli Storage Manager server

You can restore files from a VSS backup of custom applications and file system data. The backup is stored on a Tivoli Storage Manager server.

Procedure

1. If the custom application is running, stop or suspend it.
2. Restore from a Tivoli Storage Manager backup that was created on a Tivoli Storage Manager server by specifying the **fcmcli restore** command with the **/backupdestination=TSM**.

   Task   Restore the backup from drive letter G: volume that was created on a Tivoli Storage Manager server

   Command: `fcmcli.exe restore G: /backupdestination=TSM`
3. Restart or resume the custom application.

Restoring an entire volume from a VSS image sent to Tivoli Storage Manager server pools

You can restore a volume from a VSS image that is stored on Tivoli Storage Manager server pools. During backup operations, data is sent as an image backup of the VSS snapshot. The restore operation is a volume-level restore.

Before you begin

- You cannot restore an image-level backup to the volume where the Tivoli Storage Manager backup-archive client is running. To avoid an error, install the Tivoli Storage Manager backup-archive client on the system drive. The same type of failure can occur if you create an application database, for example, a SQL database, under the volume that is being restored.
- For Microsoft VSS operations to succeed, ensure that the file system is of type NTFS or ReFS. You cannot use file systems of type FAT, FAT32, and RAW.

About this task

You can complete this procedure when the **/BACKUPDESTination** parameter is set to either TSM or BOTH options.

Procedure

1. If the custom application is running, stop or suspend it.
2. If you plan to restore data from a file system, close open handles to the file system.
3. To restore from a VSS backup that is sent to Tivoli Storage Manager, enter the **fcmcli restore** command with the **/BACKUPDESTination**=TSM parameter.

Related tasks:

"Troubleshooting file system and custom application VSS restores from Tivoli Storage Manager server" on page 220

Archiving the backup to tape with third-party software

You can mount, unmount, and query backup from remote systems. In addition, you can give a user the ability to view, recover, and allow third-party software to access files from the backup. To complete these tasks, the Tivoli Storage FlashCopy Manager command-line interface is used to mount the VSS snapshots to servers. When you allow third-party software to archive the backup to tape, the following scenario can be used:

1. Server A has a Microsoft Exchange Server database and Tivoli Storage FlashCopy Manager installed. Tivoli Storage FlashCopy Manager is running on Server A to complete regular backups.

2. Server B has Tivoli Storage FlashCopy Manager installed, along with a third-party tape archive utility. Using the mount command with remote options, Server B can be directed to remotely mount the backups that are created by Server A. The third-party tape archive utility archives the backups to tape.

Mounting VSS snapshots to remote servers

You can use the command-line interface to mount VSS snapshots to remote servers that other users can access.

About this task

The following procedure is specific to Tivoli Storage FlashCopy Manager and assumes that you have at least three servers in your environment: Server A, Server B, and Server C. The backup that is created on Server A is mounted remotely to Server B.

To mount a backup remotely, the hardware provider must allow transportable snapshots. In addition, you must enable the **Import VSS snapshots only when needed** configuration option and remote Windows PowerShell.

When a backup is mounted remotely and the backup is deleted, the state of the mount point varies. The state of the mount point depends on the VSS hardware provider and storage device that is used. When a backup is mounted remotely, the backup can be deleted. When a local persistent VSS snapshot is created, a source and target volume relationship is created. The local persistent VSS snapshot is created on your storage device. In this case, when a remote mount operation occurs, the target volume is imported and mounted to the server that sends the request for the remote operation.

Procedure

1. On Server A, use the command-line interface to complete a local backup query. The query shows that the backup is mounted on Server B.

2. On Server C, use the command-line interface to complete a remote backup query of Server A. The query shows that the backup is mounted on Server B

3. When you enter a **mount** or **query** command with the /remotecomputer option, enable command-line interface tracing and enable tracing on the agent. Enable tracing on both the local and remote systems by appending /tracefile=*filename*.trc /traceflag=service to the command.

Related tasks:

"Gathering trace and log files for remote systems" on page 230

"Automating Microsoft Exchange Server tasks" on page 211

Managing Tivoli Storage FlashCopy Manager installations remotely

From a single Tivoli Storage FlashCopy Manager installation, you can manage all of the Tivoli Storage FlashCopy Manager installations in your organization.

Before you begin

Microsoft Windows PowerShell Version 3.0, or later, is required. The Windows PowerShell software must be installed and enabled on all Tivoli Storage FlashCopy Manager installations that you want to manage. For information about downloading, installing, and enabling Windows PowerShell, see this web page: Microsoft Windows Management Framework 3.0 Downloads (http://www.microsoft.com/en-us/download/details.aspx?id=34595)

About this task

Enabling Windows PowerShell Remoting is a task outside the scope of the Tivoli Storage FlashCopy Manager documentation. For your reference, the following PowerShell cmdlets are provided.

Procedure

1. Enable remote management for Tivoli Storage FlashCopy Manager installations by issuing the following Windows PowerShell command.

   ```
   Enable-PSRemoting -force
   ```

   This command enables remote management in most environments. If you use FlashCopy Manager for Microsoft Exchange Server, enable Windows PowerShell Remoting with Credential Security Support Provider (CredSSP) authentication. Complete the following steps:

   a. On the primary system, enter the following command:

   ```
   enable-wsmancredssp -role client -delegatecomputer remote_computer_name
   ```

   where `remote_computer_name` specifies the remote computer.

   b. On each remote system that runs FlashCopy Manager for Microsoft Exchange Server, issue the following command:

   ```
   enable-wsmancredssp -role server
   ```

   c. Add the Tivoli Storage FlashCopy Manager servers to the trusted hosts list by issuing the following command on each remote system

   ```
   Set-Item WSMan:\localhost\Client\TrustedHosts -Value
   remote_server_name -Force
   ```

   d. Verify that Windows PowerShell Remoting is configured correctly by issuing the following cmdlets:

   - `invoke-command -computername remote_server_name -scriptblock {pwd} -Credential $creds`
   - `invoke-command -computername remote_server_name -scriptblock {pwd} -Credential $creds -Authentication Credssp`

   e. After you make configuration changes, restart the winrm service by entering the following command:

   ```
   Restart-Service winrm
   ```

2. From Microsoft Management Console (MMC), select **IBM Tivoli Storage FlashCopy Manager**, and in the Actions pane, click **Manage Computers**.

3. From the Manage Computers window, verify that the local system is listed in the Tree Nodes and Computers panes.

Viewing, printing, and saving reports

You can access reports on recent activity and historical managed capacity. You can determine which licenses and software are installed.

Procedure

1. Select **Reporting** in the **Manage** section. A list of available reports is displayed. Each report provides a summary of the report contents.
2. Select a report from the list. The selected report displays.
3. To print or save the current report, click the appropriate icon at the top of the report.

Generating group reports

When you use the Group tree nodes in Management Console (MMC) to create a group, the Group Dashboard, Group Reports, and Group Commands tabs replace the Protect, Recover, and Automate tabs.

Before you begin

Your system must run Windows 2008 or later versions, PowerShell 3.0, and Tivoli Storage FlashCopy Manager. Workloads and backed up data must be configured successfully.

Procedure

1. In MMC, select the group with the added systems.
2. In the main window, select the Group Reports tab. The list of reports is displayed.
3. In the Actions pane, verify that the group name is correct.
4. In the Reports section, click **Refresh** to refresh the data that is displayed.

Chapter 8. Automating

With Tivoli Storage FlashCopy Manager *automation* capability, you can run commands from the command line, create scripts, schedule tasks, and use Microsoft Management Console (MMC) to start tasks. The tasks that you can automate are based on the scripts and schedules that you create.

Tivoli Storage FlashCopy Manager supports you automating tasks from the command-line interface or Microsoft Windows PowerShell command prompt (Version 3.0 and later). You can also use the **Automate** tab in MMC.

Preparing to use Windows PowerShell cmdlets with Tivoli Storage FlashCopy Manager

Tivoli Storage FlashCopy Manager includes a set of Windows PowerShell cmdlets to help you manage Data Protection for Exchange Server, Data Protection for SQL Server, and custom application data in your environment.

About this task

The cmdlets that are provided with Tivoli Storage FlashCopy Manager can be used in supported Windows environments.

Tivoli Storage FlashCopy Manager cmdlets support a seamless management environment and greatly improve remote management and automation capabilities. You can aggregate cmdlets together to form commands and use the large volume of existing cmdlets from other vendors.

Before you use the cmdlets, complete the following steps.

Procedure

1. Log on to the system as an administrator.
2. From a Windows PowerShell command line, enter the following command:

   `set-executionpolicy remotesigned`
3. Import the Windows PowerShell modules from the `FlashCopyManager` folder:

   - `FmModuleExc.dll`
   - `FmModuleFs.dll`
   - `FmModuleMMC.dll`
   - `FmModuleSQL.dll`

   From the Windows PowerShell command line, import modules, with the administrator credentials, as follows:

   a. Go to the `FlashCopyManager` folder.
   b. Enter the following commands:

      ```
      import-module .\FmModuleExc.dll
      import-module .\FmModuleFs.dll
      import-module .\FmModuleMMC.dll
      import-module .\FmModuleSQL.dll
      ```

c. (Optional) To use the cmdlets in these modules any time that you start Windows PowerShell, add the following lines to your profile. The following path is the default profile path.

```
$path = (get-itemproperty -path "HKLM:\SOFTWARE\IBM\FlashCopyManager\
 currentversion\mmc" -ea SilentlyContinue).path
if ($null -ne $path)
{
  dir "$path\fmmodule*.dll" | select -expand fullname | import-module
  -force -Global
}
```

What to do next

For information about creating, running, monitoring, and troubleshooting scripts with cmdlets, see Windows PowerShell 3.0 documentation. For more information about Windows PowerShell cmdlets, consistent naming patterns, parameters, arguments, and syntax, see this web page as a starting point:Microsoft TechNet: Getting Started with Windows PowerShell (http://technet.microsoft.com/en-us/library/hh857337.aspx).

Cmdlets for Microsoft Management Console

The following list identifies the cmdlets that you can use when interacting with Microsoft Management Console (MMC).

- **Clear-FcmMmcManagedCapacityHistory**
- **Clear-FcmMmcScheduledActivityHistory**
- **Disable-FcmMmcSchedule**
- **Enable-FcmMmcSchedule**
- **Get-FcmMmcActivity**
- **Get-FcmMmcComputerInformation**
- **Get-FcmMmcManagedCapacityHistory**
- **Get-FcmMmcReport**
- **Get-FcmMmcSchedule**
- **Get-FcmMmcScheduledActivity**
- **New-FcmMmcSchedule**
- **Remove-FcmMmcSchedule**
- **Set-FcmMmcSchedule**
- **Start-FcmMmcSchedule**

To view the details about a specific cmdlet, run the **Get-Help** cmdlet with the cmdlet name. For example:

```
Get-Help New-FcmMmcSchedule
```

To continue the example, to see examples for the cmdlet, enter:

```
get-help New-FcmMmcSchedule -examples
```

For more information, enter:

```
get-help New-FcmMmcSchedule -detailed
```

For technical information, enter:

```
get-help New-FcmMmcSchedule -full
```

For online product information, enter:

```
get-help New-FcmMmcSchedule -online
```

For information about a specific parameter, enter:

```
help New-FcmMmcSchedule -Parameter backupdestination
```

To display the help in a separate window, include the **-showwindow** parameter with the **help** command.

Cmdlets for protecting Microsoft Exchange Server data

The following table identifies the cmdlets that you can use to protect Microsoft Exchange Server data.

Table 34. Cmdlets to protect Microsoft Exchange Server data. The following table identifies the cmdlets that you can use to protect Microsoft Exchange Server data.

Cmdlet name	Related command-line interface command	Short description
Add-DpExcPolicy	tdpexcc create policy	Create a policy for FlashCopy Manager for Microsoft Exchange Server.
Backup-DpExcComponent	tdpexcc backup	Back up a Microsoft Exchange database.
Copy-DpExcPolicy	tdpexcc copy policy	Copy an existing policy.
Dismount-DpExcBackup	tdpexcc unmount backup	Dismount a backup.
Get-DpExcBackup	tdpexcc query tsm *	Query backups.
Get-DpExcComponent	tdpexcc query exchange	Query the Exchange Server for all databases that are available for backup.
Get-DpExcConfig	tdpexcc query tdp	Display configuration information.
Get-DpExcConnection	tdpexcc query tsm	Query a list of the current values set in the configuration file for Tivoli Storage Manager.
Get-DpExcInformation	tdpexcc query exchange	Query general local Exchange Server information.
Get-DpExcMailboxLocationHistory	tdpexcc q tsm /showMailboxInfo	Query the mailbox location history.
Get-DpExcManagedCapacity	tdpexcc query managedcapacity	Query managed capacity for Microsoft Exchange Server.
Get-DpExcPolicy	tdpexcc query policy	Display policy information.
Mount-DpExcBackup	tdpexcc mount backup	Mount a backup to provide access to the files that the backup contains.
Remove-DpExcBackup	tdpexcc delete backup	Remove the backup.
Remove-DpExcPolicy	tdpexcc delete policy	Delete the policy.
Reset-DpExcTsmPassword	tdpexcc changetsmpassword	Change the Tivoli Storage Manager password that is used by Data Protection for Exchange.
Restore-DpExcBackup	tdpexcc restore	Restore a backup.
Restore-DpExcMailbox	tdpexcc restore mailbox	Restore a mailbox.
Set-DpExcConfig	tdpexcc set paramname	Set the application configuration parameters in a configuration file.
Set-DpExcPolicy	tdpexcc update policy	Update a policy.

To view the details about a specific cmdlet, run the **Get-Help** cmdlet with the cmdlet name. For example:

```
Get-Help Backup-DpExcComponent
```

To continue the example, to see examples for the cmdlet, enter:

```
get-help Backup-DpExcComponent -examples
```

For more information, enter:

```
get-help Backup-DpExcComponent -detailed
```

For technical information, enter:

```
get-help Backup-DpExcComponent -full
```

For online product information, enter:

```
get-help Backup-DpExcComponent -online
```

For information about a specific parameter, enter:

```
help Backup-DpExcComponent -Parameter backupdestination
```

To display the help in a separate window, include the **-showwindow** parameter with the **help** command.

Cmdlets for protecting Microsoft SQL Server data

The following table identifies the cmdlets that you can use to protect Microsoft SQL Server data.

Table 35. Cmdlets to protect Microsoft SQL Server data. The following table identifies the cmdlets that you can use to protect Microsoft SQL Server data.

Cmdlet name	Related command-line interface command	Short description
Add-DpSqlPolicy	**tdpsqlc create policy**	Create a new policy for Microsoft SQL Server data.
Backup-DpSqlComponent	**tdpsqlc backup**	Backup SQL components.
Copy-DpSqlPolicy	**tdpsqlc copy policy**	Copy an existing policy to a new policy.
Dismount-DpSqlBackup	**tdpsqlc unmount backup**	Dismount a backup.
Get-DpSqlBackup	**tdpsqlc query tsm ***	Query the backups that are stored on the server.
Get-DpSqlComponent	**tdpsqlc query sql ***	Query the databases that are available on the SQL Server.
Get-DpSqlConfig	**tdpsqlc query tdp**	Display configuration information.
Get-DpSqlConnection	**tdpsqlc query tsm**	Display the Tivoli Storage Manager API and server information.
Get-DpSqlFileGroups	not applicable	Display all file and group information about specified SQL Server databases.
Get-DpSqlInformation	**tdpsqlc query sql**	Display specified SQL Server information.
Get-DpSqlManagedCapacity	**tdpsqlc query managedcapacity**	Assist with storage planning by determining the amount of managed capacity that is in use.
Get-DpSqlPolicy	**tdpsqlc query policy**	Query policy.
Mount-DpSqlBackup	**tdpsqlc mount backup**	Mount a backup that provides access to the files that are contained by the backup.
Remove-DpSqlBackup	**tdpsqlc delete backup** and **tdpsqlc inactivate**	Delete a VSS backup of a SQL Server database, or deactivate one or more active legacy backup objects on the Tivoli Storage Manager server.
Remove-DpSqlPolicy	**tdpsqlc delete policy**	Delete a local policy.

Table 35. Cmdlets to protect Microsoft SQL Server data (continued). The following table identifies the cmdlets that you can use to protect Microsoft SQL Server data.

Cmdlet name	Related command-line interface command	Short description
Reset-DpSqlTsmPassword	tdpsqlc changetsmpassword	Change the Tivoli Storage Manager password that is used by Data Protection for SQL Server.
Restore-DpSqlBackup	tdpsqlc restore	Restore backups of Microsoft SQL Server data.
Set-DpSqlConfig	tdpsqlc set paramname	Set the Tivoli Storage FlashCopy Manager for SQL configuration parameters in the configuration file.
Set-DpSqlPolicy	tdpsqlc update policy	Change an existing policy.

To view the details about a specific cmdlet, run the **Get-Help** cmdlet with the cmdlet name. For example:

Get-Help Get-DpSqlBackup

To continue the example, to see examples for the cmdlet, enter:

get-help Get-DpSqlBackup -examples

For more information, enter:

get-help Get-DpSqlBackup -detailed

For technical information, enter:

get-help Get-DpSqlBackup -full

For online product information, enter:

get-help Get-DpSqlBackup -online

For information about a specific parameter, enter:

help Get-DpSqlBackup -Parameter backupdestination

To display the help in a separate window, include the **-showwindow** parameter with the **help** command.

Cmdlets for protecting custom application and file system data

The following table identifies the cmdlets that you can use to protect custom application and file system data.

Table 36. Cmdlets to protect custom application and file system data. The following table identifies the cmdlets that you can use to protect custom application and file system data.

Cmdlet name	Related command-line interface command (if available)	Short description
Add-FcmFsPolicy	fcmcli create policy	Add a VSS policy binding statement.
Add-FcmFsVssPolicy	fcmcli insert vsspolicy	Insert a new VSS policy binding statement.
Backup-FcmFsComponent	fcmcli backup	Create a VSS snapshot backup of volumes and mount points.
Copy-FcmFsPolicy	fcmcli copy policy	Copy a policy.

Table 36. Cmdlets to protect custom application and file system data (continued). The following table identifies the cmdlets that you can use to protect custom application and file system data.

Cmdlet name	Related command-line interface command (if available)	Short description
`Dismount-FcmFsBackup`	`fcmcli unmount backup`	Unmount a mounted backup.
`Get-FcmFsBackup`	`fcmcli query backup`	Display information about the backup.
`Get-FcmFsComponent`	`fcmcli query component`	Query the VSS components that are available on the system.
`Get-FcmFsConfig`	`fcmcli query config`	Display configuration information.
`Get-FcmFsConnection`	`fcmcli query config`	Query Tivoli Storage Manager server connection information.
`Get-FcmFsManagedCapacity`	`fcmcli query managedcapacity`	Assist with storage planning by determining the amount of managed capacity that is in use.
`Get-FcmFsPolicy`	`fcmcli query policy`	Display policy information.
`Get-FcmFsVSSPolicy`	`fcmcli query vsspolicy`	Return the VSS policy binding statements that are stored in the configuration file.
`Mount-FcmFsBackup`	`fcmcli mount backup`	Mount a backup that provides access to the files that the backup contains.
`Remove-FcmFsBackup`	`fcmcli delete backup`	Delete a backup from FlashCopy Manager storage.
`Remove-FcmFsPolicy`	`fcmcli delete policy`	Remove a policy.
`Remove-FcmFsVssPolicy`	`fcmcli delete vsspolicy`	Delete a VSS policy binding statement.
`Reset-FcmFsTsmPassword`	`fcmcli changetsmpassword`	Change the Tivoli Storage Manager password that is used by the FlashCopy Manager for File Systems.
`Restore-FcmFsBackup`	`fcmcli restore`	Restore a backup.
`Set-FcmFsConfig`	`fcmcli update config`	Update configuration for file systems and custom applications.
`Set-FcmFsPolicy`	`fcmcli update policy`	Update an existing policy.
`Set-FcmFsVssPolicy`	`fcmcli update vsspolicy`	Update an existing VSS policy binding statement.

To view the details about a specific cmdlet, run the **Get-Help** cmdlet with the cmdlet name. For example:

```
Get-Help Backup-FcmFsComponent
```

To continue the example, to see examples for the cmdlet, enter:

```
get-help Backup-FcmFsComponent -examples
```

For more information, enter:

```
get-help Backup-FcmFsComponent -detailed
```

For technical information, enter:

```
get-help Backup-FcmFsComponent -full
```

For online product information, enter:

```
get-help Backup-FcmFsComponent -online
```

For information about a specific parameter, enter:

```
help Backup-FcmFsComponent -Parameter backupdestination
```

To display the help in a separate window, include the **-showwindow** parameter with the **help** command.

Automating Microsoft Exchange Server tasks

You can automate a workload by entering Windows PowerShell cmdlets or commands in the integrated command-line interface.

About this task

An integrated command line is available in the task window from which you can enter PowerShell cmdlets or command-line interface commands. You use the Automate view to work with commands. You can create, save, store, and schedule commands to run at the scheduled time.

Procedure

1. To open the Automate view, select a workload that you want to work with and click **Automate**.
2. Change **PowerShell** to **Command Line**.
3. To run a command, type a command in the details pane and click the **Execute** icon. You can enter the commands with or without specifying `fcmcli`.

   For example, for each selected workload instance, you can enter a single command or multiple commands, such as:

   ```
   q fcm
   ```

   You can also run a saved task by clicking the **Open** icon, selecting the command file, and clicking the **Execute** icon. The output is displayed in the main window.
4. Click the **Save** icon and follow the prompts to save a command for future use.
5. To schedule a command, click the **Schedule this command** icon to open the scheduling wizard. Follow the prompts in the wizard to create a schedule for the command. The output of the command is displayed in the results pane.
6. (Optional) Save or send the command output to an email address.

What to do next

You can automate commands from the Protect, Recover, Schedule, and Task List views in Microsoft Management Console (MMC):

1. Start MMC and select a workload in the tree view.
2. Click the tab for the task you want to do (**Protect** or **Recover**).
3. Automate the command by using one of the following methods:

   Result pane
   > Select the item for your task in the result pane, and select **Run Scheduled** in the toolbar menu. In the Actions pane, click the appropriate task. When the schedule wizard starts, enter the information for each prompt to create a scheduled task.

   Task List pane
   > When a task is submitted, it displays in the task list pane. Select the

appropriate task, then click **Schedule command script** in the task list toolbar. When the schedule wizard starts, enter the information for each prompt to create a scheduled task.

You can also right-click a task in the Task List pane and click **Copy**. Then, click the **Automate** tab and paste the command in the field.

Automating Microsoft SQL Server tasks

You can automate a workload by entering Windows PowerShell cmdlets or commands in the integrated command-line interface.

About this task

An integrated command line is available in the task window from which you can enter PowerShell cmdlets or command-line interface commands. You use the Automate view to work with commands. You can create, save, store, and schedule commands to run at the scheduled time.

Procedure

1. To open the Automate view, select a workload that you want to work with and click **Automate**.
2. Change **PowerShell** to **Command Line**.
3. To run a command, type a command in the details pane and click the **Execute** icon. You can enter the commands with or without specifying `fcmcli`.

   For example, for each selected workload instance, you can enter a single command or multiple commands, such as:

   `q fcm`

   You can also run a saved task by clicking the **Open** icon, selecting the command file, and clicking the **Execute** icon. The output is displayed in the main window.
4. Click the **Save** icon and follow the prompts to save a command for future use.
5. To schedule a command, click the **Schedule this command** icon to open the scheduling wizard. Follow the prompts in the wizard to create a schedule for the command. The output of the command is displayed in the results pane.
6. (Optional) Save or send the command output to an email address.

What to do next

You can automate commands from the Protect, Recover, Schedule, and Task List views in Microsoft Management Console (MMC):

1. Start MMC and select a workload in the tree view.
2. Click the tab for the task you want to do (**Protect** or **Recover**).
3. Automate the command by using one of the following methods:

   Result pane
   > Select the item for your task in the result pane, and select **Run Scheduled** in the toolbar menu. In the Actions pane, click the appropriate task. When the schedule wizard starts, enter the information for each prompt to create a scheduled task.

   Task List pane
   > When a task is submitted, it displays in the task list pane. Select the

appropriate task, then click **Schedule command script** in the task list toolbar. When the schedule wizard starts, enter the information for each prompt to create a scheduled task.

You can also right-click a task in the Task List pane and click **Copy**. Then, click the **Automate** tab and paste the command in the field.

Automating custom applications and file system tasks

You can automate a workload by entering Windows PowerShell cmdlets or or commands in the integrated command-line interface.

About this task

An integrated command line is available in the task window from which you can enter PowerShell cmdlets or command-line interface commands. You use the Automate view to work with commands. You can create, save, store, and schedule commands to run at the scheduled time.

Procedure

1. To open the Automate view, select a workload that you want to work with and click **Automate**.
2. Change **PowerShell** to **Command Line**.
3. To run a command, type a command in the details pane and click the **Execute** icon. You can enter the commands with or without specifying `fcmcli`.

   For example, for each selected workload instance, you can enter a single command or multiple commands, such as:

   ```
   q component
   q backup
   ```

   You can also run a saved task by clicking the **Open** icon, selecting the command file, and clicking the **Execute** icon. The output is displayed in the main window.
4. Click the **Save** icon and follow the prompts to save a command for future use.
5. To schedule a command, click the **Schedule this command** icon to open the scheduling wizard. Follow the prompts in the wizard to create a schedule for the command. The output of the command is displayed in the results pane.
6. (Optional) Save or send the command output to an email address.

What to do next

You can automate commands from the Protect, Recover, Schedule, and Task List views in Microsoft Management Console (MMC) :

1. Start MMC and select a workload in the tree view.
2. Click the tab for the task you want to do (**Protect** or **Recover**).
3. Automate the command by using one of the following methods:

   Result pane
   > Select the item for your task in the result pane, and select **Run Scheduled** in the toolbar menu. Click the appropriate task in the **Action** pane. When the schedule wizard starts, enter the information for each prompt to create a scheduled task.

   Task List pane
   > When a task is submitted, it displays in the task list pane. Select the

appropriate task, then click **Schedule command script** in the task list toolbar. When the schedule wizard starts, enter the information for each prompt to create a scheduled task.

You can also right-click a task in the Task List pane and click **Copy**. Then, click the **Automate** tab and paste the command in the field.

Scheduling tasks

Automate your data protection with Tivoli Storage FlashCopy Manager scheduling. Tivoli Storage FlashCopy Manager uses the Windows Scheduler to automate backup and restore operations. You can also schedule tasks by using the Tivoli Storage Manager Scheduler, and by using the PowerShell cmdlets that are available for use when you interact with Microsoft Management Console (MMC).

Before you begin

The scheduling wizards contain templates for PowerShell and command-line scripts. The default is PowerShell. For more information about the PowerShell cmdlets that are available for scheduling tasks, open a Windows PowerShell prompt and change directories to `C:\Program Files\Tivoli\FlashCopyManager`. Enter the following command:

`gcm -mod FmModuleMMC *schedule*`

You might see a list of available scheduling cmdlets like the following sample:

```
CommandType Name ModuleName
----------- ---- ----------
Cmdlet Clear-FcmMmcScheduledActivityHistory FmModuleMMC
Cmdlet Disable-FcmMmcSchedule FmModuleMMC
Cmdlet Enable-FcmMmcSchedule FmModuleMMC
Cmdlet Get-FcmMmcSchedule FmModuleMMC
Cmdlet Get-FcmMmcScheduledActivity FmModuleMMC
Cmdlet New-FcmMmcSchedule FmModuleMMC
Cmdlet Remove-FcmMmcSchedule FmModuleMMC
Cmdlet Set-FcmMmcSchedule FmModuleMMC
Cmdlet Start-FcmMmcSchedule FmModuleMMC
```

About this task

Restriction: With Tivoli Storage FlashCopy Manager scheduling operations, you can schedule tasks to run periodically. However, you cannot schedule tasks to run only one time.

Procedure

1. Create and edit new schedules. Use the Scheduling wizard to guide you through the steps to define a local scheduled data protection task. The Scheduling wizard is available in the Action pane. You can create the following types of schedules:

   Hourly
   > This type of schedule starts at a set time and runs indefinitely or for a set duration. It can be repeated at a specified time. Despite the duration or repeat settings, this type of schedule runs within one 24-hour period only.

   Daily This type of schedule starts at a set time and repeats each day as specified.

Weekly

This type of schedule starts at a set time and repeats every week as specified.

2. Select **PowerShell** in the scheduling wizard, and complete one or more of the following tasks:

   - Specify a single schedule to complete workloads as a single scheduled task. For example, you can complete a full backup on Sunday and incremental backups on other days.

   - Select the **MMC template** to generate and email a report. When you select **PowerShell** in the scheduling wizard, four templates are available: file system, SQL Server, Exchange Server, and MMC. The other templates include statements to ensure that the correct working directory is used, and that error information is handled correctly. The templates also include sample statements to run queries and backups.

3. After you define your schedule, run it manually. Select the schedule and, in the Actions pane, click **Run**. For more granular control of your schedules, access the Windows scheduled tasks control pane.

   By default, Tivoli Storage FlashCopy Manager schedules are activated by using Windows System Account permissions. If a schedule requires different Windows permissions, click **Run as** and enter the appropriate account and password. The following character is not supported: % All defined schedules are displayed.

4. The scheduled history log file keeps entries for 60 days, by default. To override this default value, change the scheduled history log prune value in the main Tivoli Storage FlashCopy Manager settings. In the Tree View, select the computer node that you want, and in the Actions pane, click **Properties**.

Chapter 9. Troubleshooting

Tivoli Storage FlashCopy Manager supports you in protecting Microsoft Exchange and SQL Server databases, file systems, and custom applications.

If you encounter a problem, you typically start with a symptom, or set of symptoms, and trace the root cause. Problem determination, however, is not the same as problem solving. During the process of problem determination, you might obtain sufficient information to enable you to solve the problem.

In some cases, you cannot solve a problem even after you determine its cause. For example, a performance problem might be caused by a limitation of your hardware. Debugging a VSS issue might lead you to analyze other components, for example, the VSS hardware provider, the VSS system, or the Multi Path Input Output (MPIO).

Diagnosing problems

One of the most difficult challenges of troubleshooting in a client/server environment is determining which component is the origin of the problem. VSS diagnostic wizards are available to help you test VSS snapshots on your system. You can determine whether the source of the problem is a general VSS issue or a Tivoli Storage Manager issue.

Error log files for Tivoli Storage FlashCopy Manager components

If you are protecting an Exchange or SQL Server, or a file system or custom application, an error condition occurs when you are protecting, you can view several log files to help diagnose the problem.

For example, you can confirm that Tivoli Storage FlashCopy Manager failed over by searching entries about the secondary server in the following log files:
- For Tivoli Storage FlashCopy Manager for Exchange Server, check the following files:
  - `Tivoli\tsm\TDPExchange\dsierror.log`
  - `Tivoli\tsm\baclient\dsmerror.log`
- For Tivoli Storage FlashCopy Manager for SQL Server, check the following files:
  - `Tivoli\tsm\TDPSQL\dsierror.log`
  - `Tivoli\tsm\baclient\dsmerror.log`
- For Tivoli Storage FlashCopy Manager file system and custom applications, check the following files:
  - `Tivoli\flashcopymanager\dsierror.log`
  - `Tivoli\tsm\baclient\dsmerror.log`
- Data Protection for Microsoft Exchange Server, and Data Protection for SQL Server, logs information about backup, restore, and delete commands to the Tivoli Event Console.
- Data Protection for Microsoft Exchange Server logs information, by default, to the `tdpexc.log` file in the directory where Data Protection for Microsoft Exchange Server is installed. Data Protection for SQL Server logs information, by

default, to the `tdpsql.log` file in the directory where Data Protection for SQL Server is installed. The log file indicates the date and time of a backup, the data that is backed up, and any error messages or completion codes. This file is important and must be monitored.

- The Tivoli Storage Manager API logs API error information, by default, to the `dsierror.log` file in the directory where Data Protection for Microsoft Exchange Server, or Data Protection for SQL Server, is installed. No backup statistics are contained in this log. The `dsierror.log` file cannot be marked as read-only.

- Data Protection for Microsoft Exchange Server logs information to the Exchange Server error log. Data Protection for SQL Server logs information to the SQL Server error log. The error log information can be viewed using the Exchange Server or SQL Server administration tools.

- The Tivoli Storage Manager scheduler logs information to both the `dsmsched.log` and the `dsierror.log` files. By default, these files are in the directory where the Tivoli Storage Manager backup-archive client is installed.

   Note: Output from scheduled commands is sent to the scheduler log file (`dsmsched.log`). After the scheduled work completes, check the log to ensure that the work completed successfully.

   When a scheduled command is processed, the scheduler log can contain the following entry:

   ```
   Scheduled event eventname completed successfully
   ```

   This entry is merely an indication that Tivoli Storage Manager successfully issued the scheduled command that is associated with the *eventname*. No attempt is made to determine the success or failure of the command. You can assess the success or failure of the command by evaluating the return code from the scheduled command in the scheduler log. The scheduler log entry for the command's return code is prefaced with the following text:

   ```
   Finished command. Return code is: return_code_number
   ```

- Windows System and Application Event Log.

- For VSS operations, view the `dsmerror.log` file in the backup-archive client installation directory.

Trace files for Tivoli Storage FlashCopy Manager components

When you gather trace files for local or remote systems, the files are automatically copied, compressed, and stored in the `C:\Program Files\Tivoli\flashcopymanager\problemdetermination` folder other information.

MMC   Options are stored in the MMC user settings file. The following file is generated:

   ```
   TraceFm.trc
   TraceUx.trc
   ```

Data Protection
   Tracing options are stored in the MMC user settings file and submitted to the Data Protection component as part of the command. The following file is generated:

   ```
   TraceFileFs.trc
   TraceFileSql.trc
   TraceFileExc.trc
   ```

Agent   Tracing options are stored in the VSS Requestor `dsm.opt` file. The following file is generated:

```
TraceFileAgent.trc
```

API   Tracing options are stored in the respective Data Protection `dsm.opt` file. The following file is generated:

```
TraceFileFsAPI.trc
```

Diagnosing VSS issues

You can test persistent and non-persistent VSS snapshots on your system with the assistance of a VSS diagnostics wizard.

Before you begin

Attention: Do not run these tests if you are already using SAN Volume Controller or Storwize V7000 space-efficient snapshots on your computer. If you do so, existing snapshots might be removed.

Procedure

1. Start Microsoft Management Console (MMC).
2. To open the diagnostics wizard, complete these steps:
   a. Click **Diagnostics** in the results pane of the welcome page.
   b. In the Actions pane, click **VSS Diagnostics**.

   A list of volumes are displayed, and the status of each test is displayed when it is completed.
3. To view the results of the persistent and non-persistent snapshot testing, complete these steps:
   a. Select the volumes or mount points to test and click **Next**.
   b. Click **Show VSS Information** to view details about the VSS providers, writers, and snapshots that are available on your system.

   The results of the persistent and non-persistent snapshot testing displays as Passed or Failed.
4. Review the results of the snapshot testing and click **Next**. The final results of the persistent and non-persistent snapshot testing display as Success or Unsuccessful.
5. Depending on the results, complete these steps:
   • If the testing status is a success, click **Finish** and exit the wizard.
   • If the testing status is not successful, click **Previous** and review information in the Rule dialog.
6. Return to the Management window and begin backup operations.

Resolving reproducible problems

When a component fails to operate as designed, try to reproduce the problem and capture information about the current operating environment at the time of the error. You can troubleshoot VSS backup and restore operations, mailbox restore errors, and VSS and SAN Volume Controller, Storwize V7000, or DS8000 problems.

Troubleshooting VSS backup and restore operations

If you encounter a problem during VSS backup and restore processing, attempt to reproduce the problem in your environment.

About this task

Procedure

1. Try the operation that failed again.
2. Restart the Tivoli Storage Manager services, including the TSM Client Acceptor and the TSM Remote Client Agent.
3. If the problem still exists, close other applications, especially those applications, for example antivirus applications, that interact with Exchange Server, SQL Server, or file systems. Retry the operation that failed.
4. If the problem persists, look for information in the event logs: `tdpexc.log`, `tdpsql.log`, and `baclient\dsmerror.log`. You can also review the messages in the Windows System and Application Event Log. Log entries might exist to help you identify the VSS event that triggers the issue.
5. If you do not find a resolution to the problem in the log files, complete the following steps:
   a. Restart the Exchange or SQL Server or the computer.
   b. Run the operation that failed.

Related concepts:

"Data protection in VSS environments" on page 14

Failovers from VSS instant restore processing to VSS fast restore processing

If an error occurs early in a VSS instant restore operation, the error might trigger a failover to VSS fast restore processing. However, if an errors occurs later in the instant restore operation, instant restore processing might fail without failing over to fast restore processing.

About this task

Errors in VSS instant restore operations might be, for example, a pending background copy on the storage subsystem, a failure to start the FlashCopy operation on the snapshot provider system, or another hardware error.

Procedure

Check the error message in the `dsmerror.log` file.

Troubleshooting file system and custom application VSS restores from Tivoli Storage Manager server

File system and custom application VSS restores from Tivoli Storage Manager server are volume image-level restore operations. This type of restore operation might cause the shadow copies, which are created with a system provider for the volume that is being restored, to become invalid and be deleted.

About this task

This issue occurs when the shadow storage for the volume is located within the volume. During the volume image-level restore operation, the shadow storage data is overwritten and the shadow copies are invalidated.

Procedure

Allocate the shadow storage on a different volume. For example, with the **vssadmin** tool, use the **Add ShadowStorage** command:

```
vssadmin Add ShadowStorage /For=D: /On=F: /MaxSize=your size
```

Troubleshooting issues with SQL Server tail-log backups

A database restore operation might fail if transaction log records in the *tail of the log* are not backed up.

About this task

During the restore operation, you might see the following error message:

```
Failed - An exception occurred while executing a Transact-SQL statement
or batch.
The tail-log backup of the dbName database has not been backed up.
Use BACKUP LOG WITH NORECOVERY to backup the log if it contains work you
do not want to lose.
Use the WITH REPLACE or WITH STOPAT clause of the RESTORE statement to
overwrite the contents of the log.

RESTORE DATABASE is terminating abnormally.
Changed database context to 'master'. (HRESULT:0x80131501)
```

To resolve the error, complete the tail-log backup.

Procedure

1. On the Protect tab of the SQL instance, click **Show Backup Options** and set the `Back Up Tail-log` option to **True**.
2. On the Actions pane, select **Log Backup to TSM**.

Troubleshooting VSS offline restore of a master database

Microsoft SQL Server only supports offline VSS restores of the master database. Data Protection for SQL Server does not support offline restore operations. Therefore, you cannot use Data Protection for SQL Server to restore the master database.

Procedure

1. Ensure that the SQL Server is online.
2. Restore the master database to a new database in Microsoft Management Console (MMC), or at the command line. For example: Enter the **tdpsqlc** command with the **/recovery=no** option.
3. After the restore operation is complete, verify that all data files are restored successfully.
4. Stop the SQL Server instance, and rename all data files of the master database.
5. Copy all data files from the new master_restore database to the location of the master database. Verify that all data files are copied.
6. Start the SQL Server instance and verify that the master database is restored successfully.

Related tasks:

"Restoring the master database" on page 189

Troubleshooting mailbox restore errors

If you encounter a mailbox restore error, determine whether the problem is reproducible on other Exchange Servers.

About this task

Mailbox restore errors that you might encounter include MAPI connection issues to the mailbox, insufficient role-based access control (RBAC) permissions to complete the restore operation, or issues with the Mailbox Restore Browser feature.

Related tasks:

"Restoring mailbox data" on page 163

Troubleshooting insufficient RBAC roles and permissions

For the following mailbox restore errors, ensure that the RBAC roles and management role scope are set on the Exchange objects for the Exchange user.

Procedure

1. If a mailbox fails to open and the error message indicates a missing RBAC permission, ensure that the user who is logged on to the mailbox has the required RBAC roles, and the management scope for those roles includes the database that contains the mailbox. Then, open the mailbox again.

2. If a mailbox restore operation fails and the error message indicates a missing RBAC permission, ensure that the user who is logged on to the mailbox has the required RBAC roles, and the management scope for those roles includes the source and target databases. Then, restart the restore operation.

Related concepts:

"Security requirements for Microsoft Exchange Server data" on page 18

Troubleshooting MAPI connection issues
Procedure

To diagnose MAPI-to-mailbox connection issues, enter the **TDPMAPI TESTMAPI** command with these parameters:

/MAILBOXALIAS
> This parameter is the alias name for the mailbox that you are logged on to. The parameter refers to the email alias for the user and is the portion of the email address before the @ symbol. Run this command for the mailbox to be restored and the mailbox that you are logged on to.

/EXCSERVER
> (Exchange Server 2010 environments) This parameter is the name of the Exchange Server that has the Client Access Server (CAS) role. By default, the parameter points to the local server. Use the Exchange PowerShell command, **get-ExchangeServer | fl**, to determine the Exchange Server that defined the CAS role for the mailbox database. You must specify this parameter when a CAS Load Balancer exists within the environment.
>
> (Exchange Server 2013 environments) This parameter is the name of the mailbox endpoint of the user who is logged in. Use the Exchange Powershell command, **whoami | Get-Mailbox | fl ExchangeGUID**, to determine the value. You must specify this parameter for Exchange Server 2013.

/TRACEFILE
> This parameter is the file name that is used to store the output from tracing

operations. By default, tracing is turned off. You can qualify the file name by specifying a drive and a full directory path. You must have write permissions for the user that runs the command.

Related tasks:

"Ensuring successful MAPI connections" on page 153

Troubleshooting errors in a Microsoft Exchange 2013 environment

To resolve mailbox restore errors in an Exchange Server 2013 environment, ensure that the Exchange Server mailbox permissions, authentication methods, registry key settings, and the Client Access Server (CAS) role are configured correctly.

Procedure

1. Grant full access permission to the user who is logged on to the target mailbox. When the administrator mailbox is used, Exchange Server 2013 usually blocks full access permission for the administrator by default.

2. To restore an Exchange 2013 public folder mailbox, ensure that the Exchange user has the `Public Folders` management role.

3. Log on to an Exchange Server 2013 mailbox as the Exchange Server administrator.

4. Ensure that you can access the mailbox that you logged on to and the target mailbox in either Microsoft Outlook or Outlook Web Access.

5. Specify an Exchange Server 2013 CAS by setting the **CLIENTACCESSServer**=*servername* parameter. If you are using a load balancer, set the **CLIENTACCESSServer** parameter to point to the CAS instead of the load balancer.

6. Open the administrator mailbox and the target mailbox. On the Actions pane in the Mailbox Restore Browser interface, click **Open Exchange Mailbox**.

7. Verify that the MAPI registry key, `RpcHttpProxyMap_TSM`, is correct to enable Tivoli Storage FlashCopy Manager to connect to the Exchange Server. Use one of the following methods:

   - Check the registry key that is in the `HKEY_CURRENT_USER\Software\Microsoft\ Windows NT\Current Version\Windows Messaging Subsystem` directory. Change the registry key values to reflect the correct domain, endpoint, and Remote Procedure Call (RPC) authentication methods for your environment. For example, you might specify HTTPS as the authentication method if RPC-over-HTTPS connections ares enabled for the Exchange Server that is hosting the MAPI profile. Otherwise, you might use HTTP authentication for RPC-over-HTTP connections.

   - Use the MAPI Settings property page in Microsoft Management Console (MMC) to ensure that the MAPI registry key is correct. Change the registry key values to reflect the correct domain, endpoint, and Remote Procedure Call (RPC) authentication methods for your environment.

   By default, the following registry key format is used.

   ```
   Domain=Proxy Server,RpcHttpAuthenticationMethod,
   RpcAuthenticationMethod,IgnoreSslCert
   ```

   Where the

   - *Domain* value is the domain suffix of the personalized server ID, for example, `companyname.local`. Specify any domain or a substring of a domain, or the asterisk (*) and question mark (?) wildcard characters, for example, `*.companyname.local`.

- *Proxy Server* value is the RPC proxy server that has the Client Access Server (CAS) role. Specify the fully qualified domain name (FQDN) of the RPC proxy server. Precede the FQDN by `http://` for an HTTP connection, or `https://` for an HTTPS connection. For example, `https://exchange.companyname.com`
- *RpcHttpAuthenticationMethod* value is the method that is used to authenticate RPC-over-HTTP connections. Specify NTLM, `Basic`, `Negotiate`, or `WinNT`.
- *RpcAuthenticationMethod* value is the method that is used to authenticate RPC-over-TCP connections. Specify NTLM, `Negotiate`, `WinNT`, `Anonymous`, or `None`.
- *IgnoreSslCert* value indicates whether the Exchange Server validates SSL certificates. For the Exchange Server to ignore invalid certificates, specify `False`.

The default registry key looks like the following example:

```
contoso.com=http://mail.contoso.com,ntlm,ntlm,false
```

Related tasks:

"Ensuring successful MAPI connections" on page 153

Troubleshooting issues with the Mailbox Restore Browser interface on remote systems

An error can occur when many mailboxes are queried on a remote system, which causes an out-of-memory exception.

About this task

If you restore mailboxes on the remote system, the list of mailboxes might not be displayed in the Source mailbox tree view of MMC. You might see the following message:

```
Error: Processing data for a remote command failed with the following error message:
The WSMan provider host process did not return a proper response. A provider
in the host process may have behaved improperly. For more information, see the
about_Remote_Troubleshooting Help topic.OperationStopped: (<Machine_Name>:String)
[],PSRemotingTransportExceptionJobFailure
```

Procedure

To resolve the out-of-memory exception, increase the default memory value for the remote Powershell session.
For example, to increase the maximum of memory that is allocated per shell to 4 GB, enter the following cmdlets at the Microsoft Windows PowerShell command line.

```
Set-Item WSMan:\localhost\Shell\MaxMemoryPerShellMB 4096
```

```
Set-Item WSMan:\localhost\Plugin\Microsoft.PowerShell\Quotas\MaxMemoryPerShellMB
 4096
```

```
Restart-Service winrm
```

Troubleshooting an SMTP restore issue that occurs when you restore email with large attachments in the Mailbox Restore Browser interface

If you restore an email with an attachment that is larger than 3 MB to an SMTP server, a Microsoft fix is required.

About this task

You might see the following error message:

```
QFD: System.Net.Mail - SmtpClient class throws exceptions if file attachment
is over 3 MB
```

Procedure

Resolve the issue by applying the fix that is available at this web page: Microsoft Connect Visual Studio and .NET Framework Downloads (http://support.microsoft.com/kb/2183292)

Troubleshooting a limitation with deleted mailbox history in the Mailbox Restore Browser interface

Tivoli Storage FlashCopy Manager does not record the time when mailboxes are deleted.

About this task

After a mailbox is deleted, the **Available Database Backups** list in the Mailbox Restore Browser continues to list database backups that contained the mailbox before its deletion.

Procedure

Ensure that the backup version that you select to restore from the **Available Database Backups** list contains the mailbox before it was deleted.

Deleting mailbox history information

Mailbox history includes only the mailboxes from databases that are backed up. If you back up mailbox history with a version of Tivoli Storage FlashCopy Manager earlier than version 4.1, you can manually delete the old mailbox history.

About this task

FlashCopy Manager for Microsoft Exchange Server backs up a new set of mailbox history data. With the new mailbox history data, you can experience better performance when you back up mailbox history. It is also easier to find the mailbox when you restore a mailbox. Additionally, when you retrieve mailbox history, the mailbox names can be displayed in multiple languages.

Deleting the old mailbox history is not required. If you delete the old mailbox history data, you lose the location history information for the deleted and moved mailboxes in the backup copies that earlier versions of FlashCopy Manager for Microsoft Exchange Server created.

Even if a mailbox user is deleted from Active Directory and backups that contained that mailbox are expired, Tivoli Storage FlashCopy Manager retains the mailbox history information indefinitely on the Tivoli Storage Manager server. Therefore,

you can still see the mailbox history information for deleted mailboxes within the restore search views even though the associated backups might be expired. The mailbox restore list, which is populated from the mailbox history, is not intended to be an all-inclusive list of mailboxes that can be restored. It is made available for ease of use.

Procedure

1. Enter the following command to save the mailbox history to a file:

   `tdpexcc q tsm /showmailboxinfo > E:\`*MyMailboxHistory*`.txt`

   Keep this file for reference. You can use the backup copy when you need location information for the deleted and moved mailboxes

2. If you need to restore a mailbox from the old backup copies, and the mailbox location changes before you delete the mailbox history, use the **/MAILBOXORIGLOCATION** parameter to restore the mailbox. After the old backup copies expire, mailbox history works without you having to specify the **/MAILBOXORIGLOCATION** parameter.

3. Complete the following steps to delete the old mailbox history from the Tivoli Storage Manager server.

   a. Start the Tivoli Storage Manager command-line administrative interface, `dsmadmc.exe`.

   b. Log on to the Tivoli Storage Manager server.

   c. Enter the following command to query the filespace name:

   `Query FIlespace` *node_name file_space_name*

   The format of the filespace name for mailbox history is *DomainName\MAILBOXINFO*. For example, the following command queries the filespace for the mailbox history for the *CXCLAB_EXC* node. The node_name is the **DAGNODE** name, or the Exchange Server node name when the **DAGNODE** is not being used.

   `tsm: FCM>QUERY FILESPACE CXCLAB_EXC *MAILBOXINFO`

   The following results are displayed:

Node Name	Filespace Name	FSID	Platform	Filespace Type	Is Files- pace Unicode?	Capacity	Pct Util
CXCLAB_EXC	cxcserver.- com\MAILB- OXINFO	52	TDP MSE- xchg	API:ExcD- ata	No	0 KB	0.0

4. Enter the following command to delete the filespace for the old mailbox history while bearing in mind that all previous backups, including backups of Exchange Server 2010 data, might be deleted if you do not enter the command correctly.

   `DELete FIlespace` *node_name file_space_name*`\MAILBOXINFO`

   For example, the following command deletes the filespace for the mailbox history for the *CXCLAB_EXC* node:

   `tsm: FCM>DELETE FILESPACE CXCLAB_EXC cxcserver.com\MAILBOXINFO`

Related concepts:

"Mailbox restore guidelines" on page 27

Troubleshooting configuration errors in a failover clustered environment

If you encounter errors when you configure a failover clustered environment, determine whether the options in the backup-archive client and application-specific dsm.opt files are specified correctly.

Procedure

1. When you are configuring Tivoli Storage FlashCopy Manager as a stand-alone configuration, verify that the same path to the VSSALTSTAGINGDIR directory is specified in the backup-archive client options file, tdpsql\dsm.opt, and in the Tivoli Storage FlashCopy Manager for SQL Server options file, tdpsql\dsm.opt.
2. Verify that the VSSALTSTAGINGDIR path in the dsm.opt files points to a directory on a shared disk or cluster shared volume that all cluster nodes can access.
3. In the Data Protection and Tivoli Storage FlashCopy Manager dsm.opt files, verify that the option for the **CLUSTERNODE** parameter is set to yes. When you work in a cluster environment, from the command-line interface, the Volume GUID is not displayed for volumes that are clustered disks. The clustered disk is displayed.

Related tasks:

"Configuring Tivoli Storage FlashCopy Manager for SQL Server clustered environments" on page 88

Troubleshooting VSS and SAN Volume Controller, Storwize V7000, or DS8000

If you experience VSS and SAN Volume Controller, Storwize V7000, or DS8000 problems, use these troubleshooting tips to help you discount some common configuration issues.

Procedure

1. Verify connectivity to the CIMOM (Common Information Model Object Manager) as follows:
   a. Refer to your SAN Volume Controller, Storwize V7000, or DS8000 documentation.
   b. Run the **IBMVCFG LIST** command. The default location is %Program Files%\IBM\Hardware Provider for VSS-VDS.
   c. Issue the **IBMVCFG SHOWCFG** command to view the provider configuration information.
   d. Check that the CIMOM is properly configured. Run verifyconfig.bat -u username -p password on the Master Console.
   e. Check the user name and password. If the problem is with the truststore, follow the procedure in the documentation to generate a new truststore.
2. Verify CIMOM operational issues as follows:
   a. If your backup or restore operation fails, check the IBMVSS.log file.

      If the backup or restore failure is from a CIMOM failure, the log displays output similar to the following example:

      ```
      Wed Jan 13 17:34:34.793 - Calling AttachReplicas
      Wed Jan 13 17:34:35.702 - AttachReplicas: 909ms
      Wed Jan 13 17:34:35.702 - returnValue: 34561
      Wed Jan 13 17:34:35.718 - AttachReplicas returned: 34561
      java.util.MissingResourceException: Can't find resource for
      bundle java.util.PropertyResourceBundle, key 1793
      at java.util.ResourceBundle.getObject(ResourceBundle.java:329)
      ```

```
        at java.util.ResourceBundle.getString(ResourceBundle.java:289)
        at com.ibm.cim.CIMException.<init>(CIMException.java:472)
        at ESSService.executeFlashCopy(ESSService.java:3168)
        Wed Jan 13 17:34:35.779 - IBMVSS: AbortSnapshots
```

   A return value of 0 means that the backup or restore operation is successful.

b. To determine why a backup or restore operation failed, look at the log files. The files are generated by the CLI or graphical user interface (GUI), depending on how you run your operation. The log files might provide more information about the failure.

3. If the failure seems to be for a different reason than a CIMOM failure, verify your host configuration. Run the latest support levels of the software for SAN Volume Controller, Storwize V7000, or DS8000.

4. If you are unable to resolve these problems, provide the following information to IBM Support:

   • Information that is listed in the Tivoli Storage Manager diagnostic information section

   • HBA type, firmware, and driver levels

   • SDD version

   • SAN Volume Controller microcode version (if applicable)

   • DS8000 microcode version (if applicable)

   • Storwize V7000 microcode version (if applicable)

   • SAN Volume Controller or Storwize V7000 Master Console version (if applicable)

   • For DS8000, the CIM Agent version (if applicable)

   • IBMVSS.log

   • IBMVDS.log

   • Application Event Log

   • System Event Log

   • CIMOM logs if the problem seems to be related to CIMOM. Run `CollectLogs.bat` and send the file that is created (`CollectedLogs.zip`) to IBM Support.

   The default location for SAN Volume Controller or Storwize V7000 is `C:\Program Files\IBM\svcconsole\support`, and the default location for DS8000 is `C:\Program Files\IBM\cimagent`.

   Related concepts:

   "Tivoli Storage FlashCopy Manager with IBM SAN Volume Controller and IBM Storwize V7000" on page 43

Resolving problems with IBM Support

Contact IBM Support for further assistance if you have a problem that you are unable to solve by applying maintenance fixes, reproducing the issue, or reviewing the information in previous topics. IBM Support might request to see some or all of the trace and log files related to a problem that you report.

About this task

You might be asked to set a trace on the Data Protection client that uses VSS technology, and then collect the log. IBM Support uses the information that is captured in the log file to trace a problem to its source or to determine why an

error occurred.

Viewing trace and log files

Tivoli Storage FlashCopy Manager uses several components. Each component is in its own directory along with its respective troubleshooting files. By using the Trace and Log Files view, you can easily view these files in a central location.

About this task

You can collect trace and log files in the Diagnostics property page for a workload.

These diagnostics property pages can control the tracing settings for all related components such as the workload, the Tivoli Storage Manager API, the Client Agent service, and Microsoft Management Console (MMC).

The following diagnostic modes are available:

Normal
Use for SQL legacy backup operations. Using this mode results in a small sized trace file.

Complete (default)
Using this mode results in a large sized trace file.

Custom
Use when full control over trace flags must be set

Procedure

1. When you encounter a problem in MMC, create trace files by using the Diagnostics property page.
   a. Click **Properties** > **Diagnostics**, and click **Begin**. You can set the following items:
      - You can click **Screen shot** to open the Diagnostics screen shot tool window. When you want to create a screen capture of any open windows, click **Add New Screenshot**. The name of the screen capture is added to the list of items on the Diagnostics property page. Close the Diagnostics screen shot when you finish taking screen captures.
      - For SQL workload instances, enter a database name in the **SQL Database** field, and click **Add Database Information**. Repeat this step as needed. This step is useful if one database can be backed up and another cannot. By providing the details for both databases, it helps identify differences in database properties.
   b. Close the property page and reproduce the problem.
   c. Open the Diagnostics property page and click **Stop**. Clicking the **Diagnostics** button is the preferred method for gathering information to send to your service representative. This method gathers all the information that is needed. Even if a problem occurs only on the command-line interface, command, you can always gather information by using the Automate tab. The log files are displayed in the Trace and Log Files view.
2. Click the trace or log file that you want to view. The contents of the file are displayed in the results pane. The following files are examples of the files that you can view, including default log and trace files:

   Examples of Tivoli Storage FlashCopy Manager default log and trace files:
   - Installation directory: `C:\Program Files\Tivoli\FlashCopyManager`

- dsierror.log
- Log file for custom applications and file systems workloads: `fcm.log`
- `TraceFm.trc`
- `TraceUx.trc`
- `TraceManagedCapacityHistory.trc`
- `TraceSchedLaunch.trc`
- `VssProvisioning.log`
- `TraceFileFS.trc`
- `TraceFileExc.trc`
- `TraceFileSql.trc`

If the `fcm.log` is defined in a path other than the default `C:\Program Files\Tivoli\FlashCopyManager\fcm.log`, the reports do not include the following information for scheduled backup and restore operations:
- Task completion
- Type of data protection activity
- Amount of data protection activity

The charts and reports display only information that is present in the default log file `fcm.log`.

Examples of trace logs and scripts to quiesce custom applications:
- Default directory: `%ALLUSERSPROFILE%\Application Data\Tivoli\FlashCopyManager\`*custom-application*

  where *custom-application* can be various applications. For example, an IBM Domino® mail server, or MySQL or Oracle server.

Examples of VSS Requestor default log and trace files:
- Installation directory: `C:\Program Files\Tivoli\TSM\baclient`
- `dsmerror.log`

Examples of IBM VSS provider for SAN Volume Controller, Storwize V7000, and DS8000 log files
- `IBMVDS.log`
- `IBMVss.log`

Gathering trace and log files for remote systems

Collecting diagnostic data for a remote system, by using Tivoli Storage FlashCopy Manager, is different to collecting data for a local system. You can update the Diagnostics property page to collect the correct log and trace files for remote systems.

Before you begin

On the local system, verify the following system requirements:
- Windows 7, Windows 8, Windows 2008, Windows 2008 R2, Windows 2012, Windows 2012 R2 is installed
- PowerShell version 3.0 is installed, if you are running Windows 7, Windows 8, Windows 2008, or Windows 2008 R2. With Windows 2012, PowerShell version 4.0 is installed by default.
- Tivoli Storage FlashCopy Manager version 4.1.1 or a later version is installed

On the remote system, verify the following system requirements:

- Windows 2008, Windows 2008 R2, Windows 2012, Windows 2012 R2, or a later version is installed
- Windows PowerShell version 3.0 is installed, if you are running Windows 2008, or Windows 2008 R2. With Windows 2012, PowerShell version 4.0 is installed by default.
- Tivoli Storage FlashCopy Manager version 4.1.1 or a later version is installed
- The required workload is configured.

Procedure

1. In the Actions pane, click **Properties** > **Diagnostics**, and select the mode that you require as follows.
   - For a smaller trace file, select **Normal**.
   - For a larger trace file, select **Complete**.
   - For full control over the trace flags that are set, select **Custom**.
2. Click **Begin**.
3. Click **OK** to close the window.
4. Reproduce the issue that you are seeing on the remote server. For example, back up or restore data on the remote Exchange Server.
5. Open the Diagnostics property page and click **Screenshot**. Clicking the **Diagnostics** button is the preferred method for gathering information to send to your service representative. This method gathers all the information that is needed.
6. In the Diagnostic Screen Shot Tool window, click **Add New Screen Shot**. An image is displayed. When you use the Diagnostic Screen Shot Tool on the remote system, the screen capture files are on the local system.
7. Close the Diagnostic Screen Shot Tool window.
8. Click **End**.

Results

Log, configuration, and trace files are detected and displayed, such as those files in the following example. The diagnostic log files are on the remote system.
- Microsoft Management Console (MMC): `TraceFm.trc` and `TraceUx.trc`
- Data Protection: `TraceFileFs.trc`, `TraceFileSql.trc`, `TraceFileExc.trc`
- Agent: `TraceFileAgent.trc`
- API: `TraceFileFsAPI.trc`
- Other: Hardware provider logs, System information

The files and traces are stored in the following folder on the remote system: `C:\Program Files\Tivoli\FlashCopyManager\ProblemDetermination`. Use the **Copy** function to copy the files locally.

If you enable command-line interface tracing, the command-line interface generates trace files for the local and remote systems. On the local system you can view the file that you specified. In addition, on the local and remote systems, a trace file is also created. This file has the same name as the file stored on the local system and the file name concludes with the following suffix appended to the file type extension: _remote

For example, on the local system, the following files are created after you enable command-line interface tracing:

- *filename*.trc
- *filename*.trc_remote

On the remote system, the following file is created after you enable command-line interface tracing, *filename*.trc_remote.

Related tasks:

"Mounting VSS snapshots to remote servers" on page 201

Gathering information about Exchange or SQL Server with VSS before you call IBM

The Data Protection client depends on the operating system and the Exchange or SQL Server application. Collecting all the necessary information about the environment can significantly assist Support in determining the source of problem.

Procedure

Gather as much of the following information as possible before you contact IBM Support:
- The exact level of the Windows operating system, including all service packs and test fixes that were applied.
- The exact level of the Exchange Server or SQL Server, including all service packs and test fixes that were applied.
- The exact level of FlashCopy Manager for Microsoft Exchange Server, or FlashCopy Manager for Microsoft SQL Server, with Volume Shadow Copy Service (VSS) backup and restore support.
- The exact level of the Tivoli Storage Manager API.
- The exact level of the Tivoli Storage Manager server.
- The exact level of the Tivoli Storage Manager backup-archive client.
- The exact level of the Tivoli Storage Manager storage agent (if LAN-free environment).
- The Tivoli Storage Manager server and operating system level.
- The output from the Tivoli Storage Manager server **QUERY SYSTEM** command.
- The output from the FlashCopy Manager for Microsoft Exchange Server **TDPEXCC QUERY EXCHANGE** command.
- The device type (and connectivity path) of the Exchange Server databases and logs.
- (SAN only) The specific hardware that is being used. For example: HBA, driver levels, microcode levels, SAN Volume Controller or Storwize V7000 levels, DS8000 hardware details.
- Permissions and the name of the user ID being used to run backup and restore operations.
- The name and version of antivirus software.
- (SAN only) The VSS hardware provider level.
- The VSS hardware provider log files. See the documentation of the specific VSS hardware provider on how to enable tracing and collect the trace log files.
- (SAN only) The IBM CIM agent level for DS8000, SAN Volume Controller, or Storwize V7000.
- A list of vendor-acquired Exchange applications that are running on the system.
- A list of other applications that are running on the system.

- A list of the steps that are needed to re-create the problem (if the problem can be re-created).
- If the problem cannot be re-created, list the steps that caused the problem.
- Is FlashCopy Manager for Microsoft SQL Server running in a Microsoft Failover Clustering environment?
- Does the problem occur on other Exchange or SQL servers?

Viewing system information

You can view and edit scripts that provide information about system components such as Windows-related services for Tivoli Storage FlashCopy Manager, Windows event log entries, and Volume Shadow Copy Service (VSS) information.

About this task

The System Information view is extensible. You can take advantage of this flexibility to add and share customize scripts.

Procedure

1. Open the System Information view as follows:

   a. Click **Diagnostics** in the results pane of the welcome page.

   b. Double-click **System Information** in the results pane. A list of scripts is displayed in the results pane of the System Information view. The types of scripts that are displayed are PowerShell scripts, Windows Management Instrumentation scripts, and Tivoli Storage Manager scripts.

2. Add, update, or delete your scripts, as follows:

Action	Steps

Add your own scripts	1. Click **New** in the Actions pane.
	2. If you want to copy your scripts directly to the `ProgramFiles\Tivoli\FlashCopyManager\Scripts` directory, make sure that your scripts follow these extension requirements:
	  • PowerShell scripts: `filename`.ps1
	  • Windows Management Instrumentation (WMI) scripts: `filename`.wmi
	  • Tivoli Storage Manager scripts: `filename`.tsm
	Tivoli Storage FlashCopy Manager uses the file type extension to determine how to run the script.

View or edit an existing script	1. From the list of script files in the results pane, select the name of a script that you want to view or edit. **Tip:** The name of the script is displayed in the Actions pane. Click the name of the script in the Actions pane to reveal or hide a list of actions to process. 2. To open the script file for viewing or editing, click **Command Editor** in the Actions pane. 3. View or edit the script. 4. Click **OK** to save your changes, or click **Cancel** to exit the System Information Command Editor without saving any changes.

Action	Steps
Delete a script	1. From the list of script files in the results pane, select the name of a script that you want to delete. **Tip:** The name of the script is displayed in the Actions pane. Click the name of the script in the Actions pane to reveal or hide a list of actions to process. 2. Click **Delete** in the Actions pane.

Emailing files to IBM Support

You can send diagnostic information to IBM Support.

Before you begin

About this task

The email support files feature collects all detected configuration, option, system information, trace, and log files. It also collects information about services, operating systems, and application versions. These files are compressed and then attached in an email.

Procedure

1. Start Microsoft Management Console (MMC).
2. Click **Diagnostics** in the results pane of the welcome page.
3. In the Actions pane, click **E-Mail Support files** .
4. Enter the information in the various fields and click **Done**. The information is sent to the designated support personnel and the dialog closes.

Online IBM support

Multiple online support resources are available for your reference.

The following list identifies where you can find information online:
* Tivoli Storage Manager wiki (https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/Tivoli%20Storage%20Manager).
* Storage Management community on Service Management Connect (https://www.ibm.com/developerworks/servicemanagement/sm/index.html).
* Tivoli Storage Manager for Mail (http://www.ibm.com/software/products/en/tivostormanaformail). Enter the search term to narrow the search criteria for your support requirements. Examples of search terms that you might use include an authorized program analysis report (APAR) number, release level, or operating system.

Chapter 10. Reference information

Reference information includes the backup and restore commands that you can enter at the command-line interface as an alternative to using Microsoft Management Console (MMC).

Command-line overview: Tivoli Storage FlashCopy Manager for Exchange Server

The name of the Tivoli Storage FlashCopy Manager for Exchange Server command-line interface is tdpexcc.exe. If you installed the **TDPExchange** package, or you configured the Exchange Server in Microsoft Management Console (MMC), the program is (by default) in the Tivoli Storage FlashCopy Manager for Exchange Server installation directory (C:\Program Files\Tivoli\tsm\TDPExchange\).

Command-line parameter characteristics

The command-line parameters have the following characteristics:
- Positional parameters do not include a leading slash (/) or dash (-).
- Optional parameters can display in any order after the required parameters.
- Optional parameters begin with a forward slash (/) or a dash (-).
- Minimum abbreviations for keywords are indicated in uppercase text.
- Some keyword parameters require a value.
- For those keyword parameters that require a value, the value is separated from the keyword with an equal sign (=).
- If a parameter requires more than one value after the equal sign, the values are separated with commas.
- Each parameter is separated from the others by using spaces.
- If a parameter value includes spaces, the value must be enclosed in double quotation marks.
- A positional parameter can display only once per command invocation.

Command-line interface help

Issue the **tdpexcc ?** or **tdpexcc help** command to display help for the command-line interface. You can see more specific help for commands by entering a command like the following example: **tdpexcc help backup**, where **backup** is an example of a command.

Related tasks:

"Protecting Exchange Server data" on page 153

Backup command

Use the **backup** command to run Exchange Server backups of databases from the Exchange Server to local shadow volumes managed by Tivoli Storage FlashCopy Manager.

You must have local registry rights (for all versions of Exchange Server) to run a Tivoli Storage FlashCopy Manager for Exchange Server backup.

Microsoft Exchange Server considers the wildcard character (*) to be an invalid character when used in database names. Databases that contain the wildcard character (*) in their name are not backed up. When a full VSS snapshot backup is done, the backup remains active until the backup version is deleted with the delete backup command, or expired by Tivoli Storage FlashCopy Manager according to the defined policy. Two different active backups can exist at the same time:

- Full backup, along with any associated incremental backups and differential backups.
- Copy backup, along with any associated incremental backups and differential backups.

When you run Exchange Server backups, the Exchange database file size might increase because of increased database commitments that are triggered by backup operations. This condition is a Microsoft Exchange server standard behavior.

Tivoli Storage FlashCopy Manager for Exchange Server supports the following types of VSS backups:

Full   Back up the entire database and transaction logs. If a successful backup is obtained, the Exchange Server deletes the committed log files. In Exchange Server Database Availability Group environments, the log files might not be immediately deleted after a successful full backup.

Incremental
Back up the transaction logs. If a successful backup is obtained, the Exchange Server deletes the committed log files. In Exchange Server Database Availability Group environments, the log files might not be immediately deleted after a successful incremental backup.

Differential
Back up the transaction logs. The translation logs are not deleted.

Copy   Back up the entire database and transaction logs. The transaction logs are not deleted.

All databases must be mounted at the time of the backup operation. If any database is not mounted, the database is not backed up. In addition, the transaction logs are not truncated.

Backup syntax

Use the **backup** command syntax diagrams as a reference to view available options and truncation requirements.

TDPEXCC command

```
►►─TDPEXCC─BACKup─┬─*──────────────────────┬─┬─FULL────────┬─────────────►
                  └─dbname1, ..., dbnameN─┘ ├─COPY────────┤
                                            ├─INCRemental─┤
                                            └─DIFFerential┘
```

```
├──┬──────────────────────────────────────────────────┬──────────────────────────┤
   │                           ┌─TSM──┐                │
   └─/BACKUPDESTination=───────┼─LOCAL─┼───────────────┘
                               └─BOTH──┘

├──┬──────────────────────────────────────┬───┬────────────────────────┬──────────┤
   │              ┌─tdpexc.cfg──────┐      │   └─/DAGNODE=─nodename──────┘
   └─/CONFIGfile=─┴─configfilename──┘

├──┬─────────────────────────────────────────┬───┬────────────────────┬───────────┤
   └─/EXCLUDEDAGACTive=──db-name,db-name───────┘   └─/EXCLUDEDAGPASsive─┘

├──┬─────────────────────┬───┬─────────────────────────────┬───────────────────────┤
   └─/EXCLUDENONDAGDbs───┘   └─/EXCLUDEDB=DB1, DB2, ..., DBn─┘

├──┬────────────────────────────────────┬───┬───────────────────────┬──────────────┤
   │            ┌─tdpexc.log──────┐      │   │          ┌─60─────┐    │
   └─/LOGFile=──┴─logfilename─────┘      │   └─/LOGPrune=┼─numdays─┼───┘
                                         │              └─No─────┘

├──┬──────────────────────────────────────────────┬───────────────────────────────┤
   └─/MINimumbackupinterval=──┬──────────────────┬─┘
                              └─numberOfMinutes──┘

├──┬─────────────────────────┬───┬──────────┬───┬───────────────────┬───┬────────┬──┤
   │            ┌─Yes─┐      │   └─/OFFLOAD─┘   └─/PREFERDAGPASsive─┘   └─/Quiet─┘
   └─/MOUNTWait=┴─No──┘

├──┬──────────────────────────────────────────────────────┬────────────────────────┤
   │                       ┌─No─────────────────────────┐  │
   └─/SKIPINTEGRITYCHECK───┼─Yes────────────────────────┼──┘
                           ├─SKIPDBCHECKIFHEALTHY────────┤
                           └─SKIPDBANDLOGCHECKIFHEALTHY──┘

├──┬────────────────────────────────────┬──────────────────────────────────────────►◄
   │            ┌─dsm.opt────────┐       │
   └─/TSMOPTFile=┴─dsmoptfilename─┘
```
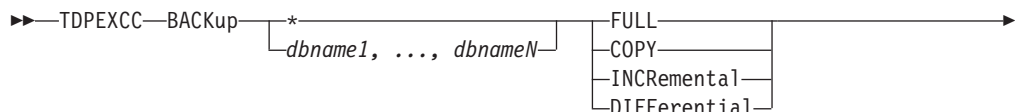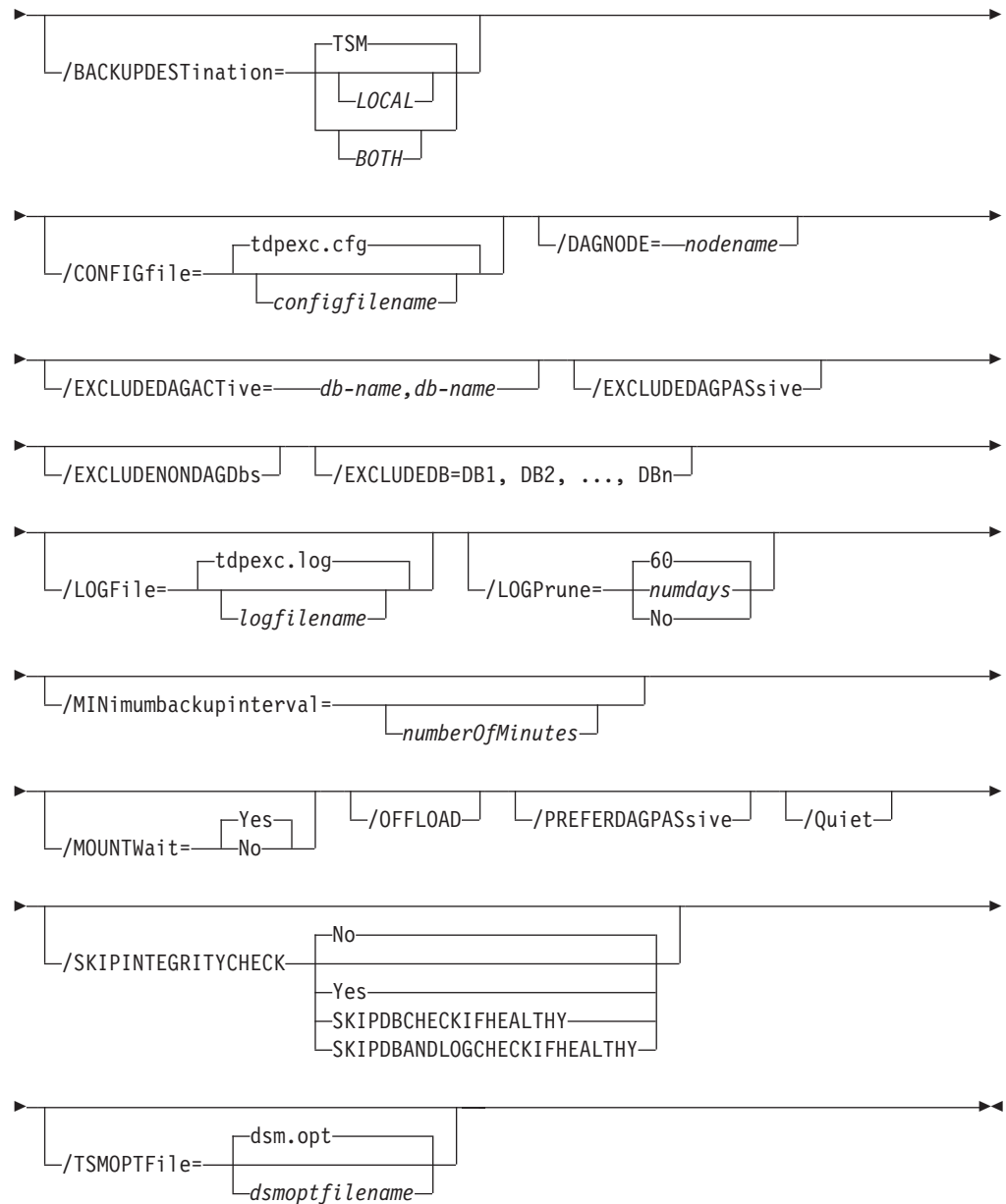
Backup positional parameters

Positional parameters immediately follow the **backup** command and precede the optional parameters.

The following positional parameters specify the object to back up:

* | *dbname1, ..., dbnameN*

> *   Back up all databases.

> *dbname*
>> Back up the specified database. Multiple entries are separated by commas. If separated by commas, ensure that there is no space between the comma and the name. If any database name contains commas or blanks, enclose the name in double quotation marks.

The following positional parameters specify the type of backup to run:

FULL | COPY | INCRemental | DIFFerential

> **FULL**   Back up the entire database, and the transaction logs, and if a successful backup is obtained, truncate the transaction logs.

> **COPY**   Back up the entire database, and the transaction logs, and do NOT truncate the transaction logs.

> **INCRemental**
> Back up the transaction logs, and if a successful backup is obtained, truncate the transaction logs.

> **DIFFerential**
> Back up the transaction log files, but do not truncate the log files.

Backup optional parameters

Optional parameters follow the **backup** command and positional parameters.

/BACKUPDESTination=LOCAL|TSM|BOTH
> When you are backing up data to a local system, set **BACKUPDESTination** to LOCAL. When you are backing up data to a Tivoli Storage Manager server, set **BACKUPDESTination** to TSM. To back up data to a local system and a Tivoli Storage Manager server, set the parameter to BOTH.

/CONFIGfile=_configfilename_
> Use the **/CONFIGfile** parameter to specify the name (_configfilename_) of the Tivoli Storage FlashCopy Manager for Exchange Server configuration file that contains the values to use for a **backup** operation.

> The _configfilename_ variable can include a fully qualified path. If the _configfilename_ variable does not include a path, the Tivoli Storage FlashCopy Manager for Exchange Server installation directory is used. If the **/CONFIGfile** parameter is not specified, or if the _configfilename_ variable is not specified, the default value is tdpexc.cfg.

> If the _configfilename_ variable includes spaces, enclose the entire **/CONFIGfile** parameter entry in double quotation marks. For example:

> /CONFIGfile="c:\Program Files\file.cfg"

/DAGNODe=_nodename_
> Specify the node name that you want to use to back up the databases in an Exchange Server Database Availability Group. With this setting, backups from all Database Availability Group members that are configured to use the DAG node are backed up to a common file space on the Tivoli Storage Manager server. The database copies are managed as a single entity, regardless of which Database Availability Group member they are backed up from. This setting can prevent Data Protection for Exchange Server from making too many backups of the same database.

/EXCLUDEDAGACTive
> Use the **/EXCLUDEDAGACTive** parameter to exclude the Exchange Server databases from backup if they belong to a Database Availability Group and are an active database copy.

/EXCLUDEDAGPASsive
> Use the **/EXCLUDEDAGPASsive** parameter to exclude the Exchange Server databases from backup if they belong to a Database Availability Group and are a passive database copy.

/EXCLUDEDB=_db-name1,db-nameN,..._
> Use the **/EXCLUDEDB** parameter to exclude the specified Exchange Server databases from the backup operation. If the database names are separated

by commas, ensure that there are no spaces between the commas and the database names. If any database name contains commas or blanks, enclose the database name in quotation marks. Wildcard characters (*) are not supported.

/EXCLUDENONDAGDbs

Use the **/EXCLUDENONDAGDbs** parameter to exclude the Exchange Server databases from backup if they do not belong to a Database Availability Group.

/LOGFile=_logfilename_

Use the **/LOGFile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager for Exchange Server.

The _logfilename_ variable identifies the name of the activity log file.

If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The _logfilename_ variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager for Exchange Server installation directory.

If the _logfilename_ variable includes spaces, enclose the entire **/logfile** parameter entry in double quotation marks. For example:

/LOGFile="c:\Program Files\mytdpexchange.log"

If the **/LOGFile** parameter is not specified, log records are written to the default log file, tdpexc.log.

The **/LOGFile** parameter cannot be turned off, logging always occurs.

When you use multiple simultaneous instances of Tivoli Storage FlashCopy Manager for Exchange Server to run operations, use the **/LOGFile** parameter to specify a different log file for each instance used. This function directs logging for each instance to a different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.

/LOGPrune=_numdays_ | **No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, _60_ days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:
- For _numdays_, the range is _0_ to _9999_. A value of _0_ deletes all entries in the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is _60_.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying _numdays_ or _no_; in this case, the default value, _60_, is used.

- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
    - Make a copy of the existing log file.
    - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/MINimumbackupinterval=*numberOfMinutes*
> If you are scheduling the backup of databases in an Exchange Server Database Availability Group, specify the minimum amount of time, in minutes, before a backup of another copy of the same Database Availability Group database can begin. The range is 1 - 9999.
>
> Setting this parameter specifies that only one database copy can be backed up within a time frame. This option prevents all of the members in a Database Availability Group from backing up the database, which would be redundant and invalidate the Tivoli Storage Manager storage management policy.

/MOUNTWait=Yes | No
> Use the **/mountwait** parameter to specify whether Data Protection for Exchange Server waits for removable media to mount (such as tapes or CDs) or to stop the current operation. This situation occurs when the Tivoli Storage Manager server is configured to store backup data on removable media and waits for a required storage volume to be mounted.
>
> You can specify these options:
>
> **Yes** Data Protection for Exchange Server waits until all initial volumes of any required removable media are made available to the Tivoli Storage Manager server before it completes the command. This option is the default.
>
> **No** Data Protection for Exchange Server ends the command (if removable media are required). An error message is displayed.

/OFFLOAD
> Specify this option if, after the VSS snapshot is complete, you want to offload the transfer of the data from the Tivoli Storage Manager server to the system specified by the **REMOTEDSMAGENTNODE** parameter. This option is only valid when the **BACKUPDESTination** parameter is set to either TSM or BOTH. The default is to not offload data.

/PREFERDAGPASsive
> If you are scheduling the backup of databases in an Exchange Server Database Availability Group, set this parameter to back up a passive database in an Exchange Server Database Availability Group unless no valid passive copy is available. If no valid passive copy is available, the backup is created from the active database copy.

/Quiet This parameter prevents status information from being displayed. This function does not affect the level of information that is written to the activity log.

/SKIPINTEGRITYCHECK
> Use the **/SKIPINTEGRITYCHECK** parameter to specify whether Data Protection for Microsoft Exchange Server bypasses the integrity checking of databases and log files, or automatically runs the integrity checking of databases and log files.

You can specify the following values:

No Run integrity checking to verify that all database and log files do not contain integrity issues. This option is the default.

Yes Bypass integrity checking of all database and log files during backup processing.

SKIPDBCHECKIFHEALTHY
Bypass integrity checking of database files only if at least two healthy copies of a database (one active and one passive copy) exist in a Database Availability Group (DAG).

SKIPDBANDLOGCHECKIFHEALTHY
Bypass integrity checking of all database and log files during backup processing only if at least two healthy copies of a database (one active and one passive copy) exist in a DAG.

Attention: If you do not specify a value with the **/SKIPINTEGRITYCHECK** parameter, integrity checking of database and log files is bypassed. If you bypass integrity checking, the backup that is stored on Tivoli Storage Manager server might not be valid, or data loss can occur.

/TSMOPTFile=_tsmoptfilename_
The **/TSMOPTFile** parameter specifies the Tivoli Storage FlashCopy Manager options file to use. Considerations:

- The _tsmoptfilename_ variable can include a fully qualified path. If you do not include a path, the Tivoli Storage FlashCopy Manager installation directory is used.

- If the _tsmoptfilename_ variable contains spaces, enclose the variable in double quotation marks. For example:

    /TSMOPTFile="c:\Program Files\dsm.opt"

- If you do not specify **/TSMOPTFile**, the default value is dsm.opt.

- If you specify **/TSMOPTFile**, but not _tsmoptfilename_, the default is also dsm.opt.

Backup example
The following list provides example of how to use the **backup** command.

To complete a full backup of a database, for example, _DB_G_, the following command can be entered:

tdpexcc backup DB_G full

To complete a copy backup of a database, for example, _DB_G_, the following command can be entered:

tdpexcc backup DB_G copy

To complete a differential backup of a database, for example, _DB_G_, the following command can be entered:

tdpexcc backup DB_G diff

To complete an incremental backup of a database, for example, _DB_G_, the following command can be entered:

tdpexcc backup DB_G incr

Delete backup command

Use the **delete backup** command to delete a VSS backup of an Exchange Server database.
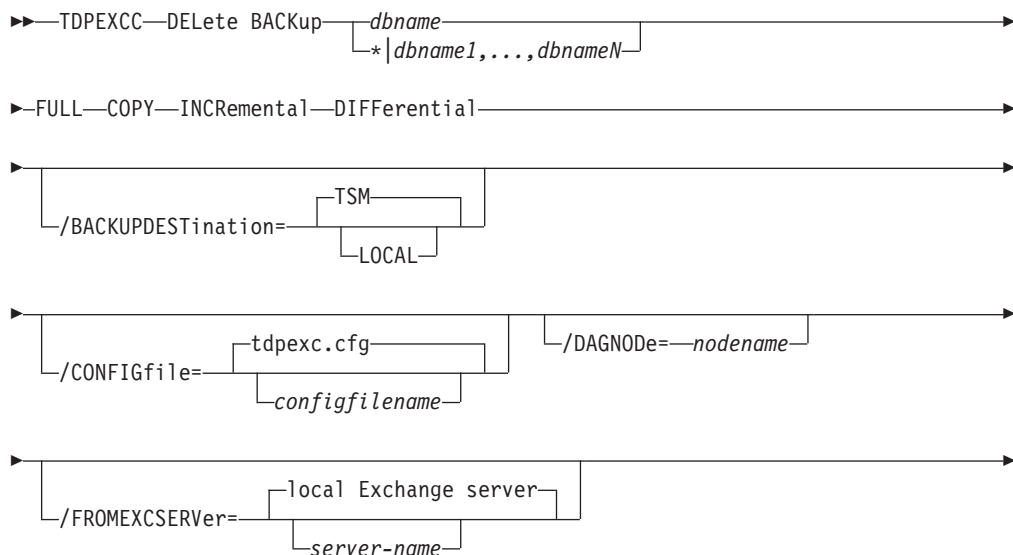
You must have local registry rights (for all versions of Exchange Server) to run a Tivoli Storage FlashCopy Manager for Exchange Server delete backup.
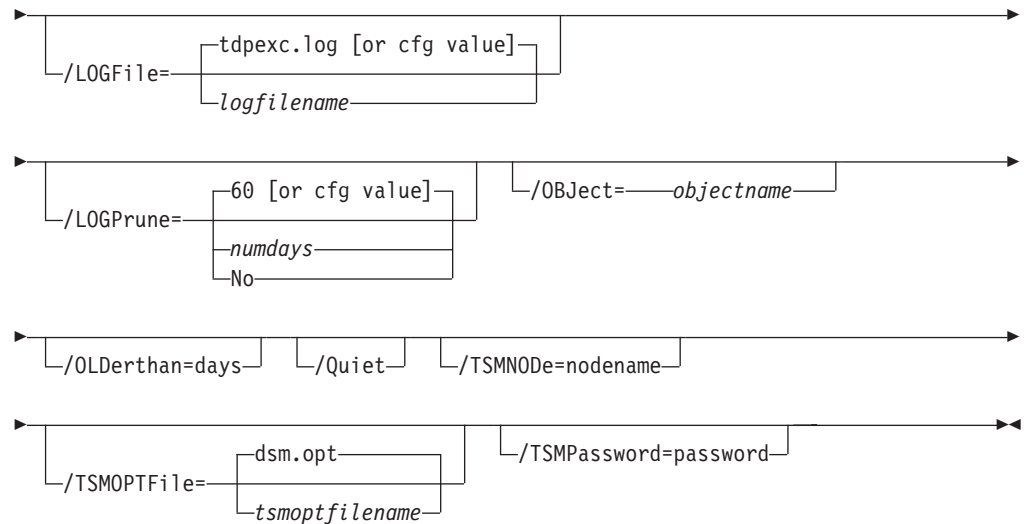
- When you run full VSS snapshot backup, the backup remains active until the backup version is either deleted with the delete backup command, or expired by Tivoli Storage FlashCopy Manager according to the defined policy. The expiration does not delete an incremental backup. Two different active backups can exist at the same time:
  - Full backup, along with any associated incremental backups and differential backups.
  - Copy backup, along with any associated incremental backups and differential backups.
- When you delete an active full or copy backup, the state of the previous active full or copy backup changes from inactive to active. However, the current active incremental or differential backup is not deleted and erroneously seems to be associated with the newly active full or copy backup. Also, the incremental or differential backup (associated with the previous inactive full or copy backup that is now changed to active) remains inactive. This inactive incremental or differential backup might not display in the query output unless the **/all** parameter is specified with the **query fcm** command.
- If you delete multiple LOCAL snapshots that are stored on SAN Volume Controller, Storwize V7000, or Space Efficient volumes, you must do so in the same order in which you created the snapshots. That is, you must delete the oldest one first, followed by the second oldest. Failure to delete them in this order can cause removal of other snapshots of the same source.

Delete backup syntax

Use the **delete backup** command syntax diagrams as a reference to view available options and truncation requirements.

TDPEXCC command

```
►►──TDPEXCC──DELete BACKup──┬──dbname───────────────────┬──────────────────►
                            └──*│dbname1,...,dbnameN────┘

►──FULL──COPY──INCRemental──DIFFerential────────────────────────────────────►

►─┬──────────────────────────────────────────────┬──────────────────────────►
  │                      ┌──TSM──┐                │
  └──/BACKUPDESTination=─┴───────┴─┐              │
                          └──LOCAL──┘

►─┬────────────────────────────────────────┬─┬─────────────────────────┬────►
  │             ┌──tdpexc.cfg───┐           │ └──/DAGNODe=──nodename────┘
  └──/CONFIGfile=┴───────────────┴─┐        │
                  └──configfilename──┘

►─┬────────────────────────────────────────────┬────────────────────────────►
  │                    ┌──local Exchange server──┐ │
  └──/FROMEXCSERVer=───┴──────────────────────────┴─┘
                        └──server-name──┘
```

```
              ┌────────────────────────────────────────────────────────────────►
├─┬──────────────────────────────────────────────────┬─
  │              ┌─tdpexc.log [or cfg value]─┐        │
  └─/LOGFile=────┼───────────────────────────┼────────┘
                 └─logfilename───────────────┘

►─┬──────────────────────────────────────────┬─┬──────────────────────────┬─►
  │             ┌─60 [or cfg value]─┐         │ └─/OBJect=────objectname────┘
  └─/LOGPrune=──┼───────────────────┼─────────┘
               ├─numdays────────────┤
               └─No─────────────────┘

►─┬──────────────────┬─┬────────┬─┬──────────────────────┬─►
  └─/OLDerthan=days──┘ └─/Quiet─┘ └─/TSMNODe=nodename─────┘

►─┬───────────────────────────────────┬─┬───────────────────────┬─►◄
  │               ┌─dsm.opt─────────┐  │ └─/TSMPassword=password──┘
  └─/TSMOPTFile=──┼─────────────────┼──┘
                  └─tsmoptfilename──┘
```

Delete backup positional parameters

Positional parameters immediately follow the **delete backup** command and precede the optional parameters.

The following positional parameters specify the backup to delete:

*|_dbname1,...,dbnameN backuptype_

> ***** Delete the active backups of all databases.
>
> _dbname_
>> Delete a backup of the specified database. The active backup is deleted unless you specify a different backup with the **/object** parameter. When multiple active incremental backups exist, the **/object** parameter must be specified with the **delete** command.
>>
>> Multiple entries are separated by commas. If separated by commas, ensure that there is no space between the comma and the component name. If any component name contains commas or blanks, enclose the name in double quotation marks.

Attention:
* Deleting incremental or differential backups can cause loss of recovery points.
* Deleting a full backup might cause incremental or differential backups to remain in a suspended state and are considered useless without a corresponding full backup.

The following positional parameters specify the type of delete backup to run:

FULL|COPY|INCRemental|DIFFerential

> **FULL** Delete full type backups.
>
> **COPY** Delete copy type backups.
>
> **INCRemental**
>> Delete incremental type backups.
>
> **DIFFerential**
>> Delete differential type backups.

Delete backup optional parameters

Optional parameters follow the **delete backup** command and positional parameters.

/BACKUPDESTination=LOCAL|TSM

> Use this parameter to specify the destination of the backups to be deleted. The default is TSM

/CONFIGfile=*configfilename*

> Use the **/configfile** parameter to specify the name (*configfilename*) of the Tivoli Storage FlashCopy Manager for Exchange Server configuration file that contains the values to use for a **delete backup** operation.
>
> The *configfilename* variable can include a fully qualified path. If the *configfilename* variable does not include a path, the Tivoli Storage FlashCopy Manager for Exchange Server installation directory is used. If the **/configfile** parameter is not specified, or if the *configfilename* variable is not specified, the default value is tdpexc.cfg.
>
> If the *configfilename* variable includes spaces, enclose the entire **/configfile** parameter entry in double quotation marks. For example:
>
> /CONFIGfile="c:\Program Files\file.cfg"

/DAGNODe=*nodename*

> Specify the node name that you want to use to back up the databases in an Exchange Server Database Availability Group. With this setting, backups from all Database Availability Group members that are configured to use the DAG node are backed up to a common file space on the Tivoli Storage Manager server. The database copies are managed as a single entity, regardless of which Database Availability Group member they are backed up from. This setting can prevent Data Protection for Exchange Server from making too many backups of the same database.

/FROMEXCSERVer=*server-name*

> Use the **/fromexcserver** parameter to specify the name of the Exchange Server where the original backup was processed.
>
> The default is the local Exchange Server.
>
> If a DAG node is specified by using the **dagnode** parameter, Tivoli Storage FlashCopy Manager for Exchange Server uses this node name instead of the Tivoli Storage FlashCopy Manager for Exchange Server node to back up databases in an Exchange Server Database Availability Group. Therefore, the **delete** command automatically deletes the backups that are created by the other DAG members, without having to specify the **/fromexcserver** parameter.

/LOGFile=*logfilename*

> Use the **/logfile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager for Exchange Server.
>
> The *logfilename* variable identifies the name of the activity log file.
>
> If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *logfilename* variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager for Exchange Server installation directory.
>
> If the *logfilename* variable includes spaces, enclose the entire **/logfile** parameter entry in double quotation marks. For example:

```
/LOGFile="c:\Program Files\mytdpexchange.log"
```

If the **/logfile** parameter is not specified, log records are written to the default log file, tdpexc.log.

The **/logfile** parameter cannot be turned off, logging always occurs.

When you use multiple simultaneous instances of Tivoli Storage FlashCopy Manager for Exchange Server to process operations, use the **/logfile** parameter to specify a different log file for each instance used. This function directs logging for each instance to a different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.

/LOGPrune=_numdays_ | **No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, _60_ days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:

- For _numdays_, the range is _0_ to _9999_. A value of _0_ deletes all entries in the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is _60_.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying _numdays_ or _no_; in this case, the default value, _60_, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/OBJect=_objectname_

Use the **/object** parameter to specify the name of the backup object you want to delete. The object name uniquely identifies each backup object and is created by Tivoli Storage FlashCopy Manager for Exchange Server.

Use the Tivoli Storage FlashCopy Manager for Exchange Server **query fcm * /all** command to view the names of all available backup objects.

The **/object** parameter is used to delete only one incremental backup at a time. When multiple active incremental backups exist, the **/object** parameter must be specified with the **delete backup** command. If it is not specified, the **delete backup** command fails.

/OLDerthan=*days*

>   Use the **/olderthan** parameter to specify how old backup files can be to be deleted. The *days* variable can range from *0 - 9999*. There is no default value for the **/olderthan** parameter.

/Quiet This parameter prevents status information from being displayed. This function does not affect the level of information that is written to the activity log.

/TSMNODe=*tsmnodename*

>   Use the *tsmnodename* variable to refer to the Tivoli Storage Manager node name that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

>   You can store the node name in the Tivoli Storage Manager options file (dsm.opt). This parameter overrides the value in the Tivoli Storage Manager options file if **PASSWORDACCESS** is set to PROMPT. This parameter is not valid when **PASSWORDACCESS** is set to GENERATE in the options file.

/TSMOPTFile=*tsmoptfilename*

>   Use the *tsmoptfilename* variable to identify the Tivoli Storage Manager options file.

>   The file name can include a fully qualified path name. If no path is specified, the Tivoli Storage FlashCopy Manager installation directory is used.

>   If the *tsmoptfilename* variable includes spaces, enclose it in double quotation marks. For example:

>    ```
>    /TSMOPTFile="c:\Program Files\file.opt"
>    ```

>   The default is dsm.opt if you do not specify the **/tsmoptfile** parameter or if you specify **/tsmoptfile** but not *tsmoptfilename*.

TSMPassword

>   Use the *tsmpassword* variable to refer to the Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

>   If you specified **PASSWORDACCESS** GENERATE in the Tivoli Storage FlashCopy Manager options file (dsm.opt), supplying the password is not necessary here because the one that is stored in the registry is used. However, to store the password in the registry, you must specify the Tivoli Storage Manager password the first time that Tivoli Storage FlashCopy Manager connects to the Tivoli Storage Manager server.

>   If you do specify a password with this parameter when **PASSWORDACCESS** GENERATE is in effect, the command-line value is ignored unless the password for this node is not yet stored in the registry. In that case, the specified password is stored in the registry and used when you run this command.

>   If **PASSWORDACCESS** PROMPT is in effect, and you do not specify a password value on the command line, you are prompted for a password.

>   The Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Delete Backup example

This output example provides a sample of the text, messages, and process status that displays when you use the **delete backup** command.

In this example, the command deletes a full backup of database *rabbitvm3_sw2ie_mbdb1*. The following output is displayed:

```
Connecting to TSM Server as node 'RABBITVM3_EXCH'...
Connecting to Local DSM Agent 'RABBITVM3'...
Using backup node 'RABBITVM3_EXCH'...
Backups to be deleted:
<rabbitvm3_sw2ie_mbdb1 : VSS : full : 10/09/2014 13:30:12>

VSS Delete backup operation completed with rc = 0
    Files Examined    : 1
    Files Completed   : 1
    Files Failed      : 0
    Total Bytes       : 0

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

Help command

Use the **tdpexcc help** command to display help for Tivoli Storage FlashCopy Manager for Exchange Server commands.

This command lists one or more commands and their parameters. When you use a language other than English, you might be required to set the width of your screen display. To view the entire help description in one screen, set the screen display width to a value greater than 80 characters. For example, set the screen width to 100 characters.

Help syntax

Use the **help** command syntax diagrams as a reference to view available options and truncation requirements.

TDPEXCC command
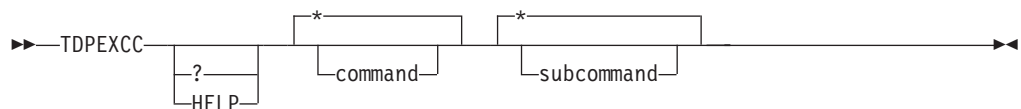
Help optional parameters

Optional parameters follow the Tivoli Storage FlashCopy Manager for Exchange Server **help** command.

The following optional parameters specify the help to be displayed:

*|*command*

   Identifies the specific Tivoli Storage FlashCopy Manager for Exchange Server command that is to be displayed. If the wildcard character (*) is used, help for all Tivoli Storage FlashCopy Manager for Exchange Server commands are displayed.

*|*subcommand*

   Help can be displayed for commands that have several subcommands, for example, the **query** command. If you do not specify a subcommand or the

wildcard character (*), help for all Tivoli Storage FlashCopy Manager for Exchange Server **query** commands are displayed.
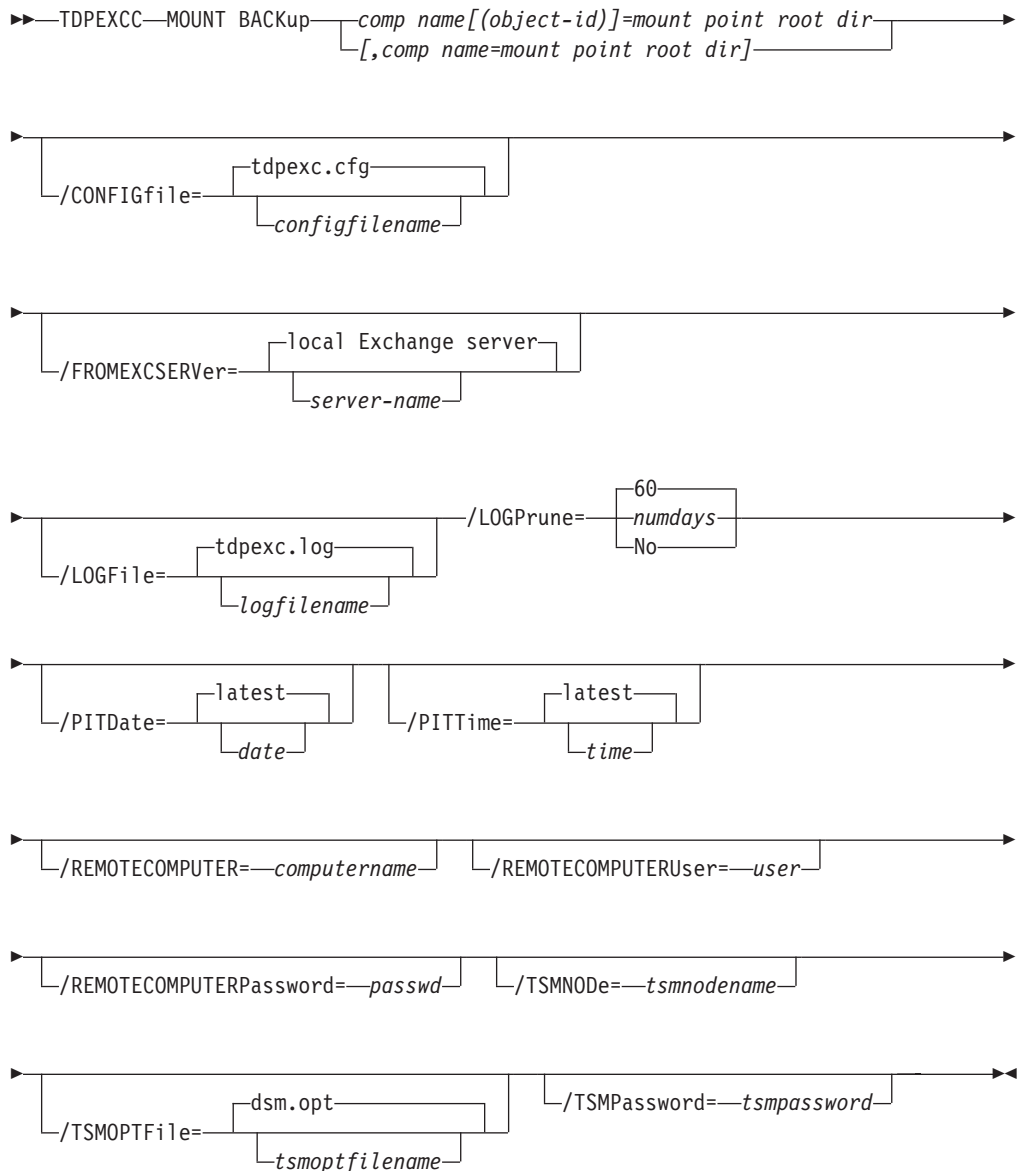
Mount backup command

To mount backups that are managed by Tivoli Storage FlashCopy Manager for Exchange Server, use the **mount backup** command.

Mount backup syntax

Use the **mount backup** command syntax diagrams as a reference to view available options and truncation requirements.

TDPEXCC command

```
►►──TDPEXCC──MOUNT BACKup──┬─comp name[(object-id)]=mount point root dir─┬──►
                           └─[,comp name=mount point root dir]───────────┘
```

```
►──┬──────────────────────────────────────────┬──────────────────────────►
   └─/CONFIGfile=──┬─tdpexc.cfg──────┬──┘
                   └─configfilename──┘
```

```
►──┬──────────────────────────────────────────────┬──────────────────────►
   └─/FROMEXCSERVer=──┬─local Exchange server─┬──┘
                      └─server-name───────────┘
```

```
►──┬───────────────────────────────────────────┬──/LOGPrune=──┬─60──────┬──►
   └─/LOGFile=──┬─tdpexc.log──────┬──┘           ├─numdays─┤
               └─logfilename──────┘              └─No──────┘
```

```
►──┬────────────────────────────────┬──┬──────────────────────────┬───────►
   └─/PITDate=──┬─latest─┬──┘        └─/PITTime=──┬─latest─┬──┘
               └─date───┘                        └─time───┘
```

```
►──┬───────────────────────────────────────┬──┬─────────────────────────────────┬──►
   └─/REMOTECOMPUTER=──computername──┘        └─/REMOTECOMPUTERUser=──user──┘
```

```
►──┬───────────────────────────────────────────┬──┬────────────────────────────┬──►
   └─/REMOTECOMPUTERPassword=──passwd──┘           └─/TSMNODe=──tsmnodename──┘
```

```
►──┬──────────────────────────────────┬──┬────────────────────────────────┬──►◄
   └─/TSMOPTFile=──┬─dsm.opt─────────┬──┘  └─/TSMPassword=──tsmpassword──┘
                   └─tsmoptfilename──┘
```

Mount backup positional parameter

The positional parameters immediately follow the **mount backup** command and precede the optional parameters.

The following positional parameters specify the objects to mount:

*component name***[(***object-id***)]=***mount point root dir***[,***component name=mount point root dir***]**

> *component name***[(***object-id***)]**
> > Specify the backup of a local Exchange database.
>
> *mount point root dir*
> > Specify the absolute path to the directory where the snapshots are going to be displayed as mount point directories. The directory must be empty. If not empty, an error is reported.

The list must contain all non-qualified objects or all qualified objects. The list cannot contain a combination of non-qualified objects and qualified objects. Specify the list by using the following syntax:

```
mount backup object-1[(object-1-id)]= mount-point-1[,object-2[(object-2-id)]
=mount-point-2...]
```

For example:

```
tdpexcc mount backup excdb(20120815064316)=f:\emptyfolder
```

Mount backup optional parameters

Optional parameters follow the **mount backup** command and positional parameters.

/CONFIGfile=*configfilename*
> Use the **/CONFIGfile** parameter to specify the name (*configfilename*) of the Tivoli Storage FlashCopy Manager for Exchange Server configuration file that contains the values to use for a **mount backup** operation.
>
> The *configfilename* variable can include a fully qualified path. If the *configfilename* variable does not include a path, the Tivoli Storage FlashCopy Manager for Exchange Server installation directory is used. If the **/CONFIGfile** parameter is not specified, or if the *configfilename* variable is not specified, the default value is tdpexc.cfg.
>
> If the *configfilename* variable includes spaces, enclose the entire **/CONFIGfile** parameter entry in double quotation marks. For example:
>
> ```
> /CONFIGfile="c:\Program Files\tdpexc.cfg"
> ```

/FROMEXCSERVer=*server-name*
> Use the **/fromexcserver** parameter to specify the name of the Exchange Server where the original backup was processed.
>
> The default is the local Exchange Server.
>
> If a DAG node is specified by using the **dagnode** parameter, Tivoli Storage FlashCopy Manager for Exchange Server uses this node name instead of the Tivoli Storage FlashCopy Manager for Exchange Server node to back up databases in an Exchange Server Database Availability Group. Therefore, the **delete** command automatically deletes the backups that are created by the other DAG members, without having to specify the **/fromexcserver** parameter.

/LOGFile=*logfilename*
> Use the **/LOGFile** parameter to specify the name of the activity log file that

is generated by Tivoli Storage FlashCopy Manager for Exchange Server. The *logfilename* variable identifies the name of the activity log file.

If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *logfilename* variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager for Exchange Server installation directory.

If the *logfilename* variable includes spaces, enclose the entire **/LOGFile** parameter entry in double quotation marks. For example:

```
/LOGFile="c:\Program Files\tdpexc.log"
```

If the **/LOGFile** parameter is not specified, log records are written to the default log file, `tdpexc.log`.

The **/LOGFile** parameter cannot be turned off, logging always occurs.

/LOGPrune=*numdays*|**No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, *60* days of log entries are saved. The option `No` can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:
- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
- If you specify `no`, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
    - Make a copy of the existing log file.
    - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/REMOTECOMPUTER=*computername*
Enter the computer name or IP address of the remote system where the backup was created.

/REMOTECOMPUTERUser=*user*
Enter the user name that is used to log on to the server specified with the **REMOTECOMPUTER** parameter. If a domain is required to log on with the domain account, enter *Domain\User*. To log on to the local account, the domain is not required. There is no default value.

/REMOTECOMPUTERPassword=*passwd*

> Enter the password for the user name that is specified with the **/REMOTECOMPUTERUser** parameter. There is no default value.

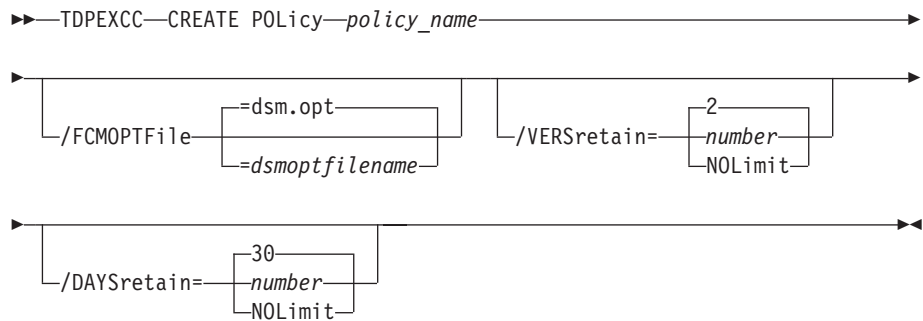**/TSMNODe=***tsmnodename*

> Use the *tsmnodename* variable to refer to the Tivoli Storage Manager node name that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.
>
> You can store the node name in the Tivoli Storage Manager options file (dsm.opt). This parameter overrides the value in the Tivoli Storage Manager options file if **PASSWORDACCESS** is set to PROMPT. This parameter is not valid when **PASSWORDACCESS** is set to GENERATE in the options file.

/TSMOPTFile=*tsmoptfilename*

> Use the *tsmoptfilename* variable to identify the Tivoli Storage Manager options file.
>
> The file name can include a fully qualified path name. If no path is specified, the directory where Tivoli Storage FlashCopy Manager is installed is searched.
>
> If the *tsmoptfilename* variable includes spaces, enclose the entire **/TSMOPTFile** parameter entry in double quotation marks. For example:
>
> /TSMOPTFile="c:\Program Files\dsm.opt"
>
> The default is dsm.opt.

/TSMPassword=*tsmpassword*

> Use the *tsmpassword* variable to refer to the Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.
>
> If you specified PASSWORDACCESS GENERATE in the Tivoli Storage FlashCopy Manager options file (dsm.opt), supplying the password is not necessary here because the one that is stored in the registry is used. However, to store the password in the registry, you must specify the Tivoli Storage Manager password the first time that Tivoli Storage FlashCopy Manager connects to the Tivoli Storage Manager server.
>
> If you do specify a password with this parameter when PASSWORDACCESS GENERATE is in effect, the command-line value is ignored unless the password for this node is not yet stored in the registry. In that case, the specified password is stored in the registry and used when you run this command.
>
> If PASSWORDACCESS PROMPT is in effect, and you do not specify a password value on the command line, then you are prompted for a password.
>
> The Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server can be up to *63* characters in length.

Policy commands for Tivoli Storage FlashCopy Manager for Exchange

Create Policy

This command is used to create a policy.

TDPEXCC command: CREATE POLicy

```
►►──TDPEXCC──CREATE POLicy──policy_name────────────────────────────────►

                      ┌─=dsm.opt─────────┐
►──┬──────────────────────────────────┬──┬──────────────────────┬──────►
   └─/FCMOPTFile──┼─=dsm.opt─────────┼─┘  └─/VERSretain=──┬─2────────┬─┘
                  └─=dsmoptfilename──┘                    ├─number─┤
                                                          └─NOLimit─┘

                      ┌─30──────┐
►──┬──────────────────────────┬────────────────────────────────────────►◄
   └─/DAYSretain=──┬─30──────┬─┘
                   ├─number─┤
                   └─NOLimit─┘
```

Parameters:

- **policy_name** (required): Specifies the name of the policy that is being created. To create a policy, the policy name must be unique.
- **FCMOPTFile**: Specifies the Tivoli Storage FlashCopy Manager options file to use.
- **VERSretain**: Specifies the number of snapshot versions to retain (*1 - 9999*). You can also specify NOLimit to represent an unlimited number of snapshot versions to retain.

  This parameter does not apply to incremental backup versions of Exchange Server data. Incremental backups do not participate in expirations because of version limits. There is never more than one version of an incremental backup object. There is only one version of an incremental backup object because incremental backups are always uniquely named.
- **DAYSretain**: Specifies the number of days to retain a snapshot (*0 - 9999*). You can also specify NOLimit to represent an unlimited number of days to retain snapshot versions.

Update Policy

This command is used to update or modify an existing policy.

TDPEXCC command: UPDATE POLicy

```
►►──TDPEXCC──UPDATE POLicy──policy_name──┬────────────────────┬─────────►
                                         └─/NEWname=──string──┘

                      ┌─=dsm.opt─────────┐
►──┬──────────────────────────────────┬──┬──────────────────────┬──────►
   └─/FCMOPTFile──┼─=dsm.opt─────────┼─┘  └─/VERSretain=──┬─number─┬─┘
                  └─=dsmoptfilename──┘                    └─NOLimit─┘

►──┬──────────────────────────┬────────────────────────────────────────►◄
   └─/DAYSretain=──┬─number─┬─┘
                   └─NOLimit─┘
```

Parameters:

- **NEWname**: Specifies the new name of the policy, if the name is being updated. The policy name must be unique.
- **policy_name** (required): Specifies the name of the policy that is being updated.
- **FCMOPTFile**: Specifies the Tivoli Storage FlashCopy Manager options file to use.
- **VERSretain**: Specifies the number of snapshot versions to retain (*1 - 9999*). You can also specify NOLimit to represent an unlimited number of snapshot versions to retain.

  This parameter does not apply to incremental backup versions of Exchange Server data. Incremental backups do not participate in expirations because of version limits. There is never more than one version of an incremental backup object. There is only one version of an incremental backup object because incremental backups are always uniquely named.
- **DAYSretain**: Specifies the number of days to retain a snapshot (*0 - 9999*). You can also specify NOLimit to represent an unlimited number of days to retain snapshot versions.

Copy Policy

This command is used to copy an existing policy to a new policy.

TDPEXCC command: COPY POLicy

►►──TDPEXCC──COPY POLicy──*existing_policy_name*──*new_policy_name*──────────►

►──┬───┬──────────────────►◄
   │   ┌─=dsm.opt──────┐   │
   └─/FCMOPTFile──┼───────────────┼───┘
                              └─=*dsmoptfilename*─┘

Parameters:
- **existing_policy_name** (required): Specifies the name of the policy that is being copied.
- **FCMOPTFile**: Specifies the Tivoli Storage FlashCopy Manager options file to use.
- **new_policy_name** (required): Specifies the name of the new policy. The policy name must be unique.

Query Policy

This command is used to list the attributes of a policy.

TDPEXCC command: Query POLicy

►►──TDPEXCC──Query POLicy──*──►◄

Parameters: * (required) Specifies all policies are to be queried. The result of the query is displayed as follows:

```
                Connecting to Exchange Server, please wait...

Policy      Number of snapshots to keep    Days to keep a snapshot

--------    --------------------------     ----------

FCMPOL                         3           60

STANDARD                       2           30
```

Delete Policy

This command is used to delete a policy.

TDPEXCC command: DELete POLicy

►►─TDPEXCC─DELete POLicy─*policy_name*─────────────────────────────────►

 ►─┬──┬─────────────────────►◄
   │   ┌─=dsm.opt─────────┐   │
   └─/FCMOPTFile─┼──────────────────┼─┘
              └─=*dsmoptfilename*─┘
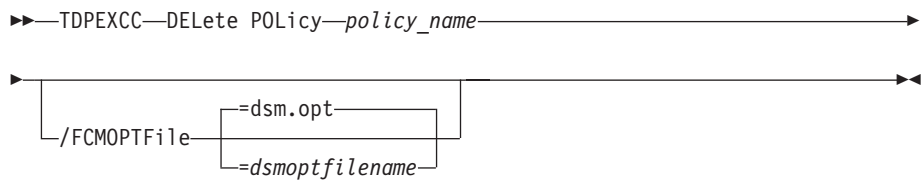
Parameters:
- **`policy_name`** (required): Specifies the name of the policy that is being deleted.
- **`FCMOPTFile`**: Specifies the Tivoli Storage FlashCopy Manager options file to use.

Exchange policy examples

These output examples provide a sample of the text, messages, and process status that displays when you use the **`create policy`** and **`delete policy`** commands.

In this example, the `tdpexcc create policy fcmexchol1` command creates the *FCMEXCHPOL1* policy. The following output is displayed:

```
C:\PROGRA~1\Tivoli\tsm\TDPExchange>tdpexcc create policy fcmexchol1

IBM Tivoli Storage Manager for Mail:
Data Protection for Microsoft Exchange Server
Version 7, Release 1, Level 2.0
(C) Copyright IBM Corporation 1998, 2015. All rights reserved.

CREATE policy was successful.

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

In this example, the `tdpexcc delete policy fcmexchol1` command deletes the *FCMEXCHPOL1* policy. The following output is displayed:

```
C:\PROGRA~1\Tivoli\tsm\TDPExchange>tdpexcc delete policy fcmexchol1

IBM Tivoli Storage Manager for Mail:
Data Protection for Microsoft Exchange Server
Version 7, Release 1, Level 2.0
(C) Copyright IBM Corporation 1998, 2015. All rights reserved.

DELETE policy was successful.

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

Query Exchange command

Use the **query exchange** command to query the local Exchange Server for general information.

The **query exchange** command returns the following information:
- Exchange Server name and version
- Domain name
- Names of all databases
- Status (online, offline) of all databases
- Circular logging status (enabled, disabled) of all databases
- VSS information:
    - Writer Name
    - Local DSMAgent Node
    - Remote DSMAgent Node
    - Writer Status (online, offline)
    - Number of selectable components

Query Exchange syntax

Use the **query exchange** command syntax diagrams as a reference to view available options and truncation requirements.

TDPEXCC command

```
►►──TDPEXCC──Query EXCHange─────────────────────────────────────────────────►
                          └/CONFIGfile=──┬──tdpexc.cfg────┬──┘
                                         └─configfilename─┘

►──┬────────────────────────────────┬──┬──────────────────────────────┬──────►
   └/FCMOPTFile──┬──=dsm.opt──────────┬─┘  └/LOGFile=──┬──tdpexc.log───┬─┘
                └──=dsmoptfilename───┘                 └─logfilename──┘

►──┬──────────────────────────┬──────────────────────────────────────────────►◄
   └/LOGPrune=──┬──60──────┬──┘
              ├─numdays──┤
              └─No───────┘
```
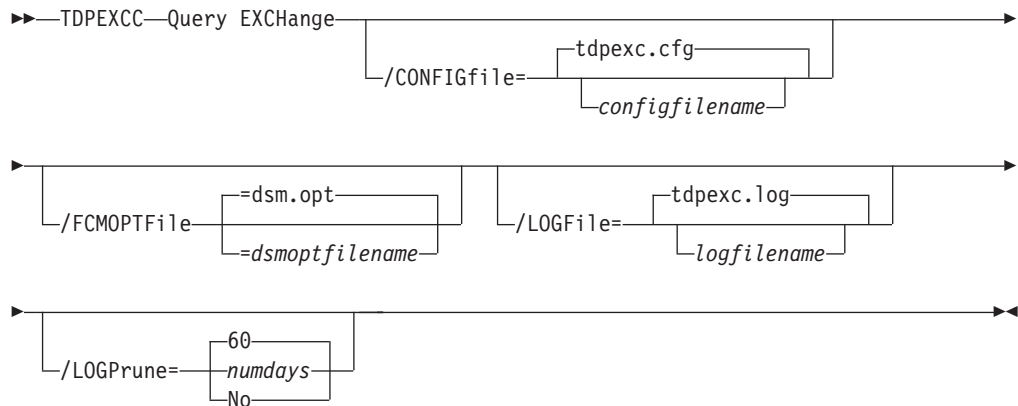
Query Exchange optional parameters

Optional parameters follow the **query exchange** command.

/CONFIGfile=*configfilename*

> Use the **/CONFIGfile** parameter to specify the name (*configfilename*) of the Tivoli Storage FlashCopy Manager for Exchange Server configuration file that contains the values to use for a **query exchange** operation.

> The *configfilename* variable can include a fully qualified path. If the *configfilename* variable does not include a path, the Tivoli Storage FlashCopy Manager for Exchange Server installation directory is used. If the **/CONFIGfile** parameter is not specified, or if the *configfilename* variable is not specified, the default value is tdpexc.cfg.

> If the *configfilename* variable includes spaces, enclose the entire **/CONFIGfile** parameter entry in double quotation marks. For example:

```
/CONFIGfile="c:\Program Files\file.cfg"
```

/FCMOPTFile=*dsmoptfilename*

> The **/FCMOPTFile** parameter specifies the Tivoli Storage FlashCopy Manager options file to use.
>
> - The *dsmoptfilename* variable can include a fully qualified path. If you do not include a path, the Tivoli Storage FlashCopy Manager installation directory is used.
> - If the *dsmoptfilename* variable spaces, enclose it in double quotation marks.
> - If you do not specify **/FCMOPTFile**, the default value is dsm.opt.
> - If you specify **/FCMOPTFile** but not *dsmoptfilename*, the default is also dsm.opt.

/LOGFile=*logfilename*

> Use the **/LOGFile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager for Exchange Server. The *logfilename* variable identifies the name of the activity log file. If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *logfilename* variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager for Exchange Server installation directory. If the *logfilename* variable includes spaces, enclose the entire **/LOGFile** parameter entry in double quotation marks. For example:
>
> ```
> /LOGFile="c:\Program Files\mytdpexchange.log"
> ```
>
> If the **/LOGFile** parameter is not specified, log records are written to the default log file, tdpexc.log. The **/LOGFile** parameter cannot be turned off, logging always occurs.
>
> When you use multiple simultaneous instances of Tivoli Storage FlashCopy Manager for Exchange Server to run operations, use the **/LOGFile** parameter to specify a different log file for each instance used. This function directs logging for each instance to a different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.

/LOGPrune=*numdays* | **No**

> When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, *60* days of log entries are saved. The option No can be entered to disable log pruning.
>
> Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.
>
> Considerations:
> - For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
> - If you specify no, the log file is not pruned.
> - If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.

- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

Query Exchange example

This output example provides a sample of the text, messages, and process status that displays when you use the **query exchange** command.

The **tdpexcc query exchange** command queries the Exchange server. An example of the output in an Exchange Server Database Availability Group environment is displayed:

```
Querying Exchange Server to gather component information, please wait...

Microsoft Exchange Server Information
------------------------------------

Server Name:                AVATAR
Domain Name:                avatar.local
Exchange Server Version:    14.1.270.1   (Exchange Server 2010)

Databases and Status
----------------------------------------

avatarDB3_D_local_bas
 Circular Logging - Disabled
 DAG Status - None
 Recovery - False
    avatarDB3_D_local_bas                     Offline

avatarDB4_D_local_bas
 Circular Logging - Disabled
 DAG Status - None
 Recovery - False
    avatarDB4_D_local_bas                     Online

avatarDB5_G_storwize_bas
 Circular Logging - Disabled
 DAG Status - None
 Recovery - False
    avatarDB5_G_storwize_bas                  Online

avatar_F_H
 Circular Logging - Disabled
 DAG Status - None
 Recovery - False
    avatar_F_H                                Online

Mailbox Database 0003208508
 Circular Logging - Disabled
 DAG Status - None
 Recovery - False
    Mailbox Database 0003208508               Online

Volume Shadow Copy Service (VSS) Information
-------------------------------------------

Writer Name          : Microsoft Exchange Writer
Local DSMAgent Node   : AVATAR
Remote DSMAgent Node  :
Writer Status         : Online
Selectable Components : 4
```

Query FCM command

Use the **query fcm** command to display Tivoli Storage FlashCopy Manager
information.

This command displays the following information:
- Compression mode
- Active policy set
- Default management class

This command can also display a list of backups that match the databases that are
entered.

Query FCM syntax

Use the **query FCM** command syntax diagrams as a reference to view available options and truncation requirements.

TDPEXCC command

```
►►──TDPEXCC──Query FCM──┬──*────────────────┬──┬──FULL──┬────┬──/ACtive──┬──┬──/ALl──┬──►
                        └──sg-name,sg-nameN──┘  ├──COPY──┤    └──────────┘  └────────┘
                                                ├──INCR──┤
                                                └──DIFF──┘

►──┬───────────────────────────────────────────────┬──►
   │             ┌──tdpexc.cfg──────┐               │
   └──/CONFIGfile=┴──────────────────┴──────────────┘
                  └──configfilename──┘

►──┬──────────────────────────────────────────────┬──►
   │            ┌──=dsm.opt──────────┐             │
   └──/FCMOPTFile┴─────────────────────┴───────────┘
                 └──=dsmoptfilename───┘

►──┬──────────────────────────────────────────────────┬──►
   │               ┌──local Exchange server──┐         │
   └──/FROMEXCSERVer=┴───────────────────────────┴──────┘
                     └──server-name──┘

►──┬─────────────────────────────────────┬──┬──────────────────────┬──►
   │          ┌──tdpexc.log──┐            │  │            ┌──60──────┐│
   └──/LOGFile=┴───────────────┴──────────┘  └──/LOGPrune=┼──numdays─┼┘
               └──logfilename──┘                          └──No──────┘

►──┬──────────────────────────────────┬──┬──────────────────────────┬──►
   └──/REMOTECOMPUTER=──computername───┘  └──/REMOTECOMPUTERUser=──user─┘

►──┬──────────────────────────────────────┬──┬─────────────────────┬──►◄
   └──/REMOTECOMPUTERPassword=──passwd──────┘  └──/SHOWMAILBOXInfo───┘
```

Query FCM positional parameters

Positional parameters immediately follow the **query FCM** command and precede the optional parameters.

The following positional parameters specify the object to query. If none of these positional parameters are specified, only the Tivoli Storage FlashCopy Manager API and Tivoli Storage FlashCopy Manager information is displayed:

* | *componentname*

> *componentname1, ..., componentnameN*
> > Query all backup objects for the specified component. Multiple entries are separated by commas.
> >
> > where *componentname* can be a database name.

The following positional parameters specify the type of backup to query. If this parameter is not specified, all backup types are displayed:

FULL   Query only full backup types.

COPY   Query only copy backup types.

INCR   Query only incremental backup types.

DIFF   Query only differential backup types.

Query FCM optional parameters

Optional parameters follow the **query FCM** command and positional parameters.

/ACtive

>Use the **/ACtive** parameter to display active backup objects only. This parameter is the default.

/ALl   Use the **/ALl** parameter to display both active and inactive backup objects. If the **/ALl** parameter is not specified, only active backup objects are displayed.

/CONFIGfile=*configfilename*

>Use the **/CONFIGfile** parameter to specify the name of the Tivoli Storage FlashCopy Manager for Exchange Server configuration file that contains the values for the Tivoli Storage FlashCopy Manager for Exchange Server configuration options.
>
>The *configfilename* variable can include a fully qualified path. If the *configfilename* variable does not include a path, the Tivoli Storage FlashCopy Manager for Exchange Server installation directory is used. If the **/CONFIGfile** parameter is not specified, or if the *configfilename* variable is not specified, the default value is tdpexc.cfg.
>
>If the *configfilename* variable includes spaces, enclose the entire **/CONFIGfile** parameter entry in double quotation marks. For example:
>
>/CONFIGfile="c:\Program Files\file.cfg"

/DETail

>Use the **/DETail** parameter to display detailed output from the query command.
>
>- The *dsmoptfilename* variable can include a fully qualified path. If you do not include a path, the Tivoli Storage FlashCopy Manager installation directory is used.
>- If the *dsmoptfilename* variable spaces, enclose it in double quotation marks.
>- If you do not specify **/FCMOPTFile**, the default value is dsm.opt.
>- If you specify **/FCMOPTFile**, but not *dsmoptfilename*, the default is also dsm.opt.

/FCMOPTFile=*dsmoptfilename*

>The **/FCMOPTFile** parameter specifies the Tivoli Storage FlashCopy Manager options file to use.
>
>- The *dsmoptfilename* variable can include a fully qualified path. If you do not include a path, the Tivoli Storage FlashCopy Manager installation directory is used.
>- If the *dsmoptfilename* variable spaces, enclose it in double quotation marks.
>- If you do not specify **/FCMOPTFile**, the default value is dsm.opt.
>- If you specify **/FCMOPTFile**, but not *dsmoptfilename*, the default is also dsm.opt.

/FROMEXCSERVer=*server-name*

>Use the **/fromexcserver** parameter to specify the name of the Exchange Server where the original backup was processed.

The default is the local Exchange Server.

If a DAG node is specified by using the **dagnode** parameter, Tivoli Storage FlashCopy Manager for Exchange Server uses this node name instead of the Tivoli Storage FlashCopy Manager for Exchange Server node to back up databases in an Exchange Server Database Availability Group. Therefore, the **delete** command automatically deletes the backups that are created by the other DAG members, without having to specify the **/fromexcserver** parameter.

/LOGFile=_logfilename_

Use the **/LOGFile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager for Exchange Server.

The _logfilename_ variable identifies the name of the activity log file.

If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The _logfilename_ variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager for Exchange Server installation directory.

If the _logfilename_ variable includes spaces, enclose the entire **/LOGFile** parameter entry in double quotation marks For example:

/LOGFile="c:\Program Files\mytdpexchange.log"

If the **/LOGFile** parameter is not specified, log records are written to the default log file, tdpexc.log.

The **/LOGFile** parameter cannot be turned off, logging always occurs.

When you use multiple simultaneous instances of Tivoli Storage FlashCopy Manager for Exchange Server to run operations, use the **/LOGFile** parameter to specify a different log file for each instance used. This function directs logging for each instance to a different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.

/LOGPrune=_numdays_ | **No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, _60_ days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:
- For _numdays_, the range is _0_ to _9999_. A value of _0_ deletes all entries in the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is _60_.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying _numdays_ or _no_; in this case, the default value, _60_, is used.

- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
    - Make a copy of the existing log file.
    - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/REMOTECOMPUTER=*computername*
> Enter the IP address or host name for the remote system where you want to query the data that is backed up.

/REMOTECOMPUTERUser=*user*
> Enter the user name that is used to log on to the server specified with the **REMOTECOMPUTER** parameter. If a domain is required to log on with the domain account, enter *Domain\User*. To log on to the local account, the domain is not required. There is no default value.

/REMOTECOMPUTERPassword=*passwd*
> Enter the password for the user name that is specified with the **REMOTECOMPUTERUser** parameter. There is no default value.

/SHOWMAILBOXInfo
> Use the **/SHOWMAILBOXInfo** parameter to display mailbox history information in backup databases.

Query FCM example

The following command shows detailed information about current backups: **query fcm * /detail**

```
IBM FlashCopy Manager for Mail:
FlashCopy Manager for Microsoft Exchange Server
Version 7, Release 1, Level 2.0
(C) Copyright IBM Corporation 1998, 2015. All rights reserved.

Querying FlashCopy Manager server for a list of database backups, please wait...


Connecting to FCM Server as node 'TIVVM483_EXC'...
Connecting to Local DSM Agent 'TIVVM483'...
Using backup node 'DAG2'...

DAG : DAG2

Backup Object Information
------------------------

Exchange Server Name ..................... TIVVM483
Database Availability Group .............. DAG2
Backup Database Name ..................... RATTEST_DAGDB
Backup Method ............................ VSS
Backup Location .......................... Loc
Backup Object Type ....................... full
Mount Points Root Directory ..............
Backup Object State ...................... Active
Backup Creation Date / Time .............. 08/22/2014 22:23:00
Backup Supports Instant Restore .......... No
Backup Object Size / Name ................ 172.07MB / 20120822222300
Backup Object Size / Name ................ 36.01MB / Logs
Backup Object Size / Name ................ 136.06MB / File

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

Query Managedcapacity command

Use the **Query Managedcapacity** command to assist with storage planning by determining the amount of managed capacity in use.

Purpose

The **Query Managedcapacity** command displays capacity-related information about the volumes that are represented in local inventory that is managed by Tivoli Storage FlashCopy Manager. This command is valid for all Windows operating systems that are supported by Tivoli Storage FlashCopy Manager.

TDPEXCC command

```
►►──TDPEXCC──Query MANAGEDCAPacity──────────────────────────────────►◄
                                    └─/Detailed─┘
```

Parameters

/Detailed
    Results in a detailed listing of snapped volumes. If this option is not specified, then only the total capacity is displayed.

In this example, the **tdpexcc query managedcapacity** command displays the total amount of managed capacity in use in the local inventory. The following output is displayed:

```
Total Managed Capacity : 47.99 GB (51,533,307,904 bytes)
```

In this example, the **tdpexcc query managedcapacity /detailed** command displays a detailed listing of total amount of managed capacity and the snapped volumes in use. The following output is displayed:

```
IBM FlashCopy Manager for Mail:
FlashCopy Manager for Microsoft Exchange Server
Version 7, Release 1, Level 2.0
(C) Copyright IBM Corporation 1998, 2015. All rights reserved.


Total Managed Capacity : 31.99 GB (34,353,438,720 bytes)

Volume           : M:
Managed Capacity : 16.00 GB (17,176,719,360 bytes)

Volume           : F:
Managed Capacity : 16.00 GB (17,176,719,360 bytes)
Total Managed Capacity : 1,019.72 MB (1,069,253,632 bytes)
```

Query TDP command

Use the **query tdp** command to query a list of the current values that are set in the configuration file for Tivoli Storage FlashCopy Manager for Exchange Server.

Query TDP syntax

Use the **query TDP** command syntax diagrams as a reference to view available options and truncation requirements.

TDPEXCC command

```
►►──TDPEXCC──Query TDP────────────────────────────────────────────►
                        └─/CONFIGfile=─┬─tdpexc.cfg─────┬─┘
                                       └─configfilename─┘

►──────────────────────────────────────────────────────────────►◄
   └─/LOGFile=─┬─tdpexc.log────┬─┘  └─/LOGPrune=─┬─60──────┬─┘
              └─logfilename─┘                    ├─numdays─┤
                                                 └─No──────┘
```

Query TDP optional parameters

Optional parameters follow the **query TDP** command.

/CONFIGfile=_configfilename_

Use the **/CONFIGfile** parameter to specify the name (_configfilename_) of the Tivoli Storage FlashCopy Manager for Exchange Server configuration file that contains the values to use for a **query tdp** operation.

The _configfilename_ variable can include a fully qualified path. If the _configfilename_ variable does not include a path, the Tivoli Storage FlashCopy Manager for Exchange Server installation directory is used. If the **/CONFIGfile** parameter is not specified, or if the _configfilename_ variable is not specified, the default value is tdpexc.cfg.

If the _configfilename_ variable includes spaces, enclose the entire **/CONFIGfile** parameter entry in double quotation marks. For example:

`/CONFIGfile="c:\Program Files\file.cfg"`

/LOGFile=_logfilename_

Use the **/LOGFile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager for Exchange Server.

The _logfilename_ variable identifies the name of the activity log file.

If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The _logfilename_ variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager for Exchange Server installation directory.

If the _logfilename_ variable includes spaces, enclose the entire **/LOGFile** parameter entry in double quotation marks. For example:

`/LOGFile="c:\Program Files\mytdpexchange.log"`

If the **/LOGFile** parameter is not specified, log records are written to the default log file, tdpexc.log.

The **/LOGFile** parameter cannot be turned off, logging always occurs.

When you use multiple simultaneous instances of Tivoli Storage FlashCopy Manager for Exchange Server to run operations, use the **/LOGFile** parameter to specify a different log file for each instance used. This function directs logging for each instance to a different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.

/LOGPrune=_numdays_ | **No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, _60_ days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:

- For _numdays_, the range is _0_ to _9999_. A value of _0_ deletes all entries in the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is _60_.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying _numdays_ or _no_; in this case, the default value, _60_, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

Query TDP example

This output example provides a sample of the text, messages, and process status that displays when you use the **query TDP** command.

An example of the output in a VSS configuration is displayed.

```
IBM FlashCopy Manager for Mail:
FlashCopy Manager for Microsoft Exchange Server
Version 7, Release 1, Level 2.0
(C) Copyright IBM Corporation 1998, 2015. All rights reserved.

FlashCopy Manager for Exchange Preferences
-----------------------------------------

BACKUPDESTination................... LOCAL
DATEformat ......................... 1
IMPORTVSSSNAPSHOTSONLYWhenneeded ... No
LANGuage ........................... ENU
LOCALDSMAgentnode................... CENTORI
LOGFile ............................ tdpexc.log
LOGPrune ........................... 60
MOUNTWait .......................... Yes
NUMberformat ....................... 1
REMOTEDSMAgentnode..................
TEMPDBRestorepath...................
TEMPLOGRestorepath..................
TIMEformat ......................... 1
```

Restore command

Use the **restore** command to restore a database backup from local shadow
volumes that are managed by Tivoli Storage FlashCopy Manager to an Exchange
Server.

To complete a Tivoli Storage FlashCopy Manager for Exchange Server restore, you
must have local registry rights for all versions of the Exchange Server.

When you use the **restore** command, remember the following guidelines:
- When you restore inactive backups or active incremental backups, use the
  /object parameter to specify the name of the backup object to restore. This
  object name uniquely identifies the backup instance that is managed byTivoli
  Storage FlashCopy Manager storage. You can enter a **tdpexcc query fcm * /all**
  command to obtain a list of all the active and inactive backup objects.

  If the tdpexcc restore dbname incr command is entered (without the **/object**
  parameter) to restore multiple active incremental backups, all multiple active
  incremental backups are restored sequentially. The **/object** parameter is used to
  restore only one incremental backup at a time.
- Use the **/eraseexistinglogs** parameter to direct the program to erase the
  existing transaction log files for the database before it restores the database. If
  you do not specify this option, existing transaction logs are not erased, and
  might be reapplied when the Exchange databases are mounted. This parameter
  is only valid when you restore a FULL or COPY VSS backup of Exchange Server
  databases.
- Specify /mountdatabases=yes if you are restoring the last backup and you want
  the database or databases to be automatically mounted after the recovery is
  completed. Only transaction logs that are contained in the backup is applied to
  the mailbox database when you run a recovery database restore. You must
  specify **/recover**=*applyrestoredlogs* when you restore a mailbox database to a
  recovery database. Otherwise, the restore operation might fail.

The graphical user interface provides an easy-to-use, flexible interface to help you
run a restore operation. The interface presents information in a way that allows
multiple selection and, in some cases, automatic operation.

Microsoft Exchange Server considers the wildcard character (*) to be an invalid character when used in database names. Databases that contain the wildcard character (*) in their name are not backed up.

Tivoli Storage FlashCopy Manager for Exchange Server supports the following types of restore:

Full   Restore a full type backup.

Copy   Restore a copy type backup.

Incremental
     Restore an incremental type backup.

Differential
     Restore a differential type backup.

Restore syntax

Use the **restore** command syntax diagrams as a reference to view available options and truncation requirements.

TDPEXCC command

```
►►──TDPEXCC────────────────────────────────────────────────────────────────►

►──RESTore──┬─*───────────────────────────────────────────────┬──┬─FULL─────────┬──►
            └─componentname1, ..., componentnameN (ObjectIDN)─┘  ├─COPY─────────┤
                                                                 ├─INCRemental──┤
                                                                 └─DIFFerential─┘

►──┬──────────────────────┬──┬──────────────────────────────┬──────────────────►
   └─/DAGNODE=──nodename─┘     └─/FCMOPTFile─┬─=dsm.opt──────────┬─┘
                                            └─=dsmoptfilename─┘

►──┬──────────────────────────────────────────────┬──┬───────────────────────────┬──►
   └─/FROMEXCSERVer=─┬─local Exchange server─┬─┘     └─/INSTANTRESTORE=─┬─Yes─┬─┘
                     └─server-name──────────┘                          └─No──┘

►──┬──────────────────────┬──┬─────────────────────────────┬──────────────────────►
   └─/INTODB=──db-name─┘     └─/LOGFile=─┬─tdpexc.log────┬─┘
                                        └─logfilename─┘

►──┬──────────────────────────┬──┬─────────────────────────┬──┬────────────────────┬──►
   └─/LOGPrune=─┬─60──────┬─┘     └─/MOUNTDAtabases=─┬─No──┬─┘  └─/MOUNTWait=─┬─Yes─┬─┘
               ├─numdays─┤                          └─Yes─┘                  └─No──┘
               └─No──────┘

►──┬──────────────────────────────────────────────┬──┬──────────┬──────────────────►
   └─/OBJect=─┬─current active backup object─┬─┘     └─/Quiet─┘
             └─object-name──────────────────┘

►──┬────────────────────────────────────┬──┬───────────────────────────────────┬──►◄
   └─/RECOVer=─┬─APPLYALLlogs──────┬─┘     └─/TEMPLOGRESTorepath=──path-name─┘
              └─APPLYRESToredlogs─┘
```

Restore positional parameters

Positional parameters immediately follow the **restore** command and precede the optional parameters.

The following positional parameters specify the object to restore:

* | *database_name1, ..., database_nameN*

>   *   Restore all components sequentially.

The following positional parameters specify the type of restore to run:

FULL | COPY | INCRemental | DIFFerential

>   **FULL**   Restore a full backup.

>   **COPY**   Restore a copy backup.

>   **INCRemental**
>   Restore an incremental backup.

>   **DIFFerential**
>   Restore a differential backup.

Restore optional parameters

Optional parameters follow the **restore** command and positional parameters.

/CONFIGfile=_configfilename_
>   Use the **/CONFIGfile** parameter to specify the name of the Tivoli Storage
>   FlashCopy Manager for Exchange Server configuration file that contains
>   the values for the Tivoli Storage FlashCopy Manager for Exchange Server
>   configuration options.
>
>   The *configfilename* variable can include a fully qualified path. If the
>   *configfilename* variable does not include a path, the Tivoli Storage
>   FlashCopy Manager for Exchange Server installation directory is used. If
>   the **/CONFIGfile** parameter is not specified, or if the *configfilename* variable
>   is not specified, the default value is tdpexc.cfg.
>
>   If the *configfilename* variable includes spaces, enclose the entire **/CONFIGfile**
>   parameter entry in double quotation marks. For example:
>   /CONFIGfile="c:\Program Files\file.cfg"

/DAGNODe=_nodename_
>   Specify the node name that you want to use to back up the databases in an
>   Exchange Server Database Availability Group. With this setting, backups
>   from all Database Availability Group members that are configured to use
>   the DAG node are backed up to a common file space on the Tivoli Storage
>   Manager server. The database copies are managed as a single entity,
>   regardless of which Database Availability Group member they are backed
>   up from. This setting can prevent Data Protection for Exchange Server
>   from making too many backups of the same database.

/FCMOPTFile=_dsmoptfilename_
>   The **/FCMOPTFile** parameter specifies the Tivoli Storage FlashCopy Manager
>   options file to use.
>
>   - The *dsmoptfilename* variable can include a fully qualified path. If you do
>   not include a path, the Tivoli Storage FlashCopy Manager installation
>   directory is used.
>   - If the *dsmoptfilename* variable spaces, enclose it in double quotation
>   marks.

- If you do not specify **/FCMOPTFile**, the default value is dsm.opt.
- If you specify **/FCMOPTFile** but not *dsmoptfilename*, the default is also dsm.opt.

/FROMEXCSERVer=*server-name*

Use the **/fromexcserver** parameter to specify the name of the Exchange Server where the original backup was processed.

The default is the local Exchange Server.

If a DAG node is specified by using the **dagnode** parameter, Tivoli Storage FlashCopy Manager for Exchange Server uses this node name instead of the Tivoli Storage FlashCopy Manager for Exchange Server node to back up databases in an Exchange Server Database Availability Group. Therefore, the **delete** command automatically deletes the backups that are created by the other DAG members, without having to specify the **/fromexcserver** parameter.

/INSTANTRestore=Yes|No

Use the **/INSTANTRestore** parameter to specify whether to use volume level snapshot or file level copy to restore a VSS backup that is on local shadow volumes. The default value is Yes. An IBM Systems Storage SAN Volume Controller, DS8000, the XIV system, and IBM Storwize V7000 storage subsystem is required to complete VSS Instant Restores.

You can specify:

Yes   Use volume level snapshot restore for a VSS backup that is on local shadow volumes if the backup exists on volumes that support it. This option is the default.

No   Use file level copy to restore the files from a VSS backup that is on local shadow volumes. Bypassing volume-level copy means that Exchange database files, log files, and the checkpoint file are the only data overwritten on the source volumes.

When a VSS instant restore is completed on DS8000 and Storwize family, make sure that any previous background copies (that involve the volumes that are being restored) are completed before you initiate the VSS instant restore operation. The **/instantrestore** parameter is ignored and VSS instant restore capabilities are automatically disabled when it runs any type of VSS restore into operation. VSS instant restore of differential and incremental backups is not supported.

/INTODB=*db-name*

Use the **/INTODB** parameter to specify the name of the database into which the VSS backup is restored. The database name must be specified with the *db-name* variable. For example, if RDB is the name of the database into which the VSS backup is restored, the input on the command line is as follows:

```
TDPEXCC RESTore Maildb1 FULL /INTODB=RDB
```

However, when you restore a database that is relocated (system file path, log file path, or database file path), you must specify the same database name as the one you are restoring. For example, if *Maildb5* is the name of the relocated database that is being restored, the command-line entry is as follows:

```
TDPEXCC RESTore Maildb5 FULL /INTODB=Maildb5
```

- There is no default value.

- To restore into a Recovery Database (RDB) or alternate database, an RDB or alternate database must exist before you attempt the restore operation.

/LOGFile=*logfilename*

Use the **/LOGFile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager for Exchange Server.

The *logfilename* variable identifies the name of the activity log file.

If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *logfilename* variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager for Exchange Server installation directory.

If the *logfilename* variable includes spaces, enclose the entire **/logfile** parameter entry in double quotation marks. For example:

```
/LOGFile="c:\Program Files\mytdpexchange.log"
```

If you do not specify the **/LOGFile** parameter, log records are written to the default log file, tdpexc.log.

The **/LOGFile** parameter cannot be turned off, logging always occurs.

When you use multiple simultaneous instances of Tivoli Storage FlashCopy Manager for Exchange Server to run operations, use the **/LOGFile** parameter to specify a different log file for each instance used. This function directs logging for each instance to a different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.

/LOGPrune=*numdays* | **No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, *60* days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:

- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:

- Make a copy of the existing log file.
- Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/MOUNTDAtabases=No|Yes

Use the **/mountdatabases** parameter to specify whether to mount the databases after the restore operation is completed. You must specify one of the following values:

Yes   Mount the databases after the restore operation is completed.

No   Do not mount the databases after the restore operation is completed. This option is the default.

/MOUNTWait=Yes | No

Use the **/mountwait** parameter to specify whether Data Protection for Exchange Server waits for removable media to mount (such as tapes or CDs) or to stop the current operation. This situation occurs when the Tivoli Storage Manager server is configured to store backup data on removable media and waits for a required storage volume to be mounted.

You can specify these options:

Yes   Data Protection for Exchange Server waits until all initial volumes of any required removable media are made available to the Tivoli Storage Manager server before it completes the command. This option is the default.

No   Data Protection for Exchange Server ends the command (if removable media are required). An error message is displayed.

/OBJect=_object-name_

Use the **/object** parameter to specify the name of the backup object you want to restore. The object name uniquely identifies each backup object and is created by Tivoli Storage FlashCopy Manager for Exchange Server.

Use the Tivoli Storage FlashCopy Manager for Exchange Server `query fcm /all` command to view the names of active and inactive backup objects.

If the `tdpexcc restore dbname incr` command is entered (without the **/object** parameter) to restore multiple active incremental backups, all multiple active incremental backups are restored sequentially. The **/object** parameter is used to restore only one incremental backup at a time.

/Quiet This parameter prevents status information from being displayed. This function does not affect the level of information that is written to the activity log.

/RECOVER=APPLYRESToredlogs|APPLYALLlogs

Use this parameter to specify whether you want to run recovery after you restore an object. If the database is not mountable, you can either restore the last backup again and specify the **/RECOVER**=_value_ option or you can use the Microsoft **ESEUTIL /cc** command to run recovery manually.

You must specify one of the following values when you use this parameter:

APPLYALLlogs

Specify /recover=applyalllogs to replay the restored-transaction log entries and the current active-transaction log entries. Any transaction logs entries that display in the current active-transaction log are replayed. This option is the default.

APPLYRESToredlogs

Specify /recover=applyrestoredlogs to replay only the

restored-transaction log entries. The current active-transaction log entries are not replayed. When you choose this option for a restore, your next backup must be a full or copy backup.

When you restore multiple backup objects, the **/RECOVER** option must be used on the restore of the last object.

/TEMPLOGRESTorepath=*path-name*
Use the **/TEMPLOGRESTorepath** parameter to specify the default temporary path to use when logs and patch files are restored. For best performance, this path must be on a different physical device than the current active-transaction logger.

If you do not specify the **/TEMPLOGRESTorepath** parameter, the default value is the value that is specified by the **/TEMPLOGRESTorepath** option in the Tivoli Storage FlashCopy Manager for Exchange Server configuration file. The default Tivoli Storage FlashCopy Manager for Exchange Server configuration file is tdpexc.cfg.

If you do not specify the **/TEMPLOGRESTorepath** parameter, and the **/TEMPLOGRESTorepath** value does not exist in the Tivoli Storage FlashCopy Manager for Exchange Server configuration file, the TEMP environment variable value is used.

When you do a full or copy restore operation, all log files in the path that is specified by the **/TEMPLOGRESTorepath** parameter are erased. In addition, the value of **/TEMPLOGRESTorepath** must not be the same value as the current location for the database. If the value is the same, the database can become corrupted.

Do not specify double-byte characters (DBCS) within the temporary log path.

Restore example
This output example provides a sample of the text, messages, and process status that displays when you use the **restore** command.

In this example, the command completes an instant restore of the local backup for mailbox database *rabbitvm3_sw2ie_mbdb1*. The following output is displayed:

```
Connecting to TSM Server as node 'RABBITVM3_EXCH'...
Connecting to Local DSM Agent 'RABBITVM3'...
Using backup node 'RABBITVM3_EXCH'...
Starting Microsoft Exchange restore...

Beginning VSS restore of 'rabbitvm3_sw2ie_mbdb1'. This operation could take a while,
please wait...
Restoring 'rabbitvm3_sw2ie_mbdb1' via volume-level copy from snapshot(s). This process may
take some time. Please wait.
VSS Restore operation completed with rc = 0
   Files Examined      : 0
   Files Completed     : 0
   Files Failed        : 0
   Total Bytes         : 0
   Total LanFree Bytes : 0

Running recovery.  This operation might take some time, depending on the number
of transaction logs being replayed.

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

Restorefiles command

Use the **restorefiles** command to restore flat files from a backup into a specified directory.

The following information provides details about this using the **restorefiles** command:

- The **restorefiles** command is only available on the command-line interface.
- This command does not require an Exchange Server to be installed on, or accessible from the system where **restorefiles** is run.
- Files can be restored to an alternative system or to an alternative directory on the same system as the Exchange Server.
- The **restorefiles** operation fails if a previously restored file exists, except for VSS backup files.
- The command continues until it succeeds, or until the destination volume does not contain enough space for the operation.
- When you restore files from an inactive backup or an active incremental backup, use the **/object** parameter to specify the name of the backup object. The object name uniquely identifies the backup instance in Tivoli Storage Manager server storage. A list of backup object names is obtained by issuing the **query tsm * /all** command.

A VSS **restorefiles** operation overwrites files that exist and have the same name. If a log file from an incremental backup has the same name as the log file from the full backup operation, you can run two consecutive **restorefiles** operations to the same directory:

1. Run the following command to restore a full backup:

   `tdpexcc restorefiles DB1 FULL /into=d:\temprestore`

2. Run the following command to restore the log files during the incremental restore:

   `tdpexcc restorefiles DB1 INCR /into=d:\temprestore`

Before you issue the **restorefiles** command, make sure that you have sufficient disk space to hold all of the flat files. For example, if your database and logs are 50 GB in size, you need 50 GB available in the destination directory that is specified by the **/into** parameter. For VSS backups, do not issue a **restorefiles** command to the existing location of the production or active database. Those files are overwritten.

Restorefiles syntax

Use the **restorefiles** command syntax diagrams as a reference to view available options and truncation requirements.

TDPEXCC command

```
►►──TDPEXCC──RESTOREFIles─────┬─*──────────────┬──────┬─FULL────────┬───────────►
                              └─dbname,dbnameN─┘      ├─COPY────────┤
                                                      ├─INCRemental─┤
                                                      └─DIFFerential┘
```

```
     ┌─────────────────────────────────────────────────────────────────────┐
├──┬────────────────────────┬──┬─────────────────────────────────────────┬──┤
   └─/DAGNODE=─nodename─┘      │                    ┌─=dsm.opt───────┐     │
                              └─/FCMOPTFile─┬──────────────────────┬─┘
                                            └─=dsmoptfilename─┘

     ┌──────────────────────────────────────────────────────────────────────┐
├──┬──────────────────────────────────────────┬──┬──────────────────────────┬──┤
   │                  ┌─local Exchange server─┐ │  └─/INTO=path──pathname─┘
   └─/FROMEXCSERVer=──┴─────────────────────┬─┴─┘
                       └─servername─┘

     ┌─────────────────────────────────────────────────────────────────────┐
├──┬───────────────────────┬──┬────────────────────┬──────────────────────────┤
   │          ┌─tdpexc.log─┐ │  │         ┌─60───────┐
   └─/LOGFile=─┴──────────┬─┴─┘  └─/LOGPrune=─┼─numdays─┤
               └─logfilename─┘                └─No──────┘

     ┌─────────────────────────────────────────────────────────────────────┐
├──┬─────────────────┬──┬──────────────────────────────────────────┬──────────┤
   │         ┌─Yes─┐ │  │         ┌─current active backup object─┐
   └─/MOUNTWait=─┴─No──┘  └─/OBJect=─┴────────────────────────────┬─┘
                                     └─object name─┘

├──┬──────────┬────────────────────────────────────────────────────────────────►◄
   └─/Quiet─┘
```
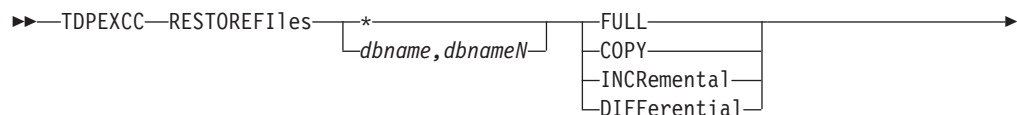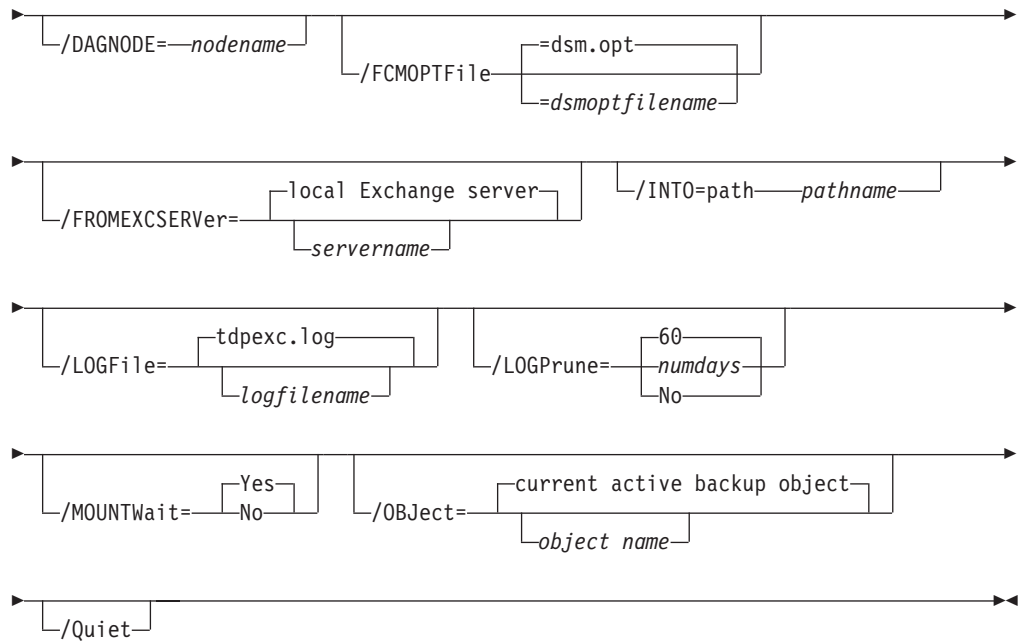
Restorefiles positional parameters

Positional parameters immediately follow the **restorefiles** command and precede the optional parameters.

The following positional parameters specify the object to restore:

* *dbname*

> ***** Sequentially restore all flat files for the database.
>
> *dbname*
> > Restore the specified database files. Multiple entries are separated by commas.

The following positional parameters specify the type of backup from which the files are restored:

FULL | COPY | INCRemental | DIFFerential *dbname*

> **FULL** Restore the files from a full backup.
>
> **COPY** Restore the files from a copied backup.
>
> **INCRemental**
> > Restore the files from an incremental backup.
>
> **DIFFerential**
> > Restore the files from a differential backup.

Restorefiles optional parameters

The optional parameters for the **restorefiles** command and positional parameters are listed.

/CONFIGfile=_configfilename_

Use the **/CONFIGfile** parameter to specify the name of the Tivoli Storage FlashCopy Manager for Exchange Server configuration file that contains the values for the Tivoli Storage FlashCopy Manager for Exchange Server configuration options.

The _configfilename_ variable can include a full path. If the _configfilename_ variable does not include a path, the Tivoli Storage FlashCopy Manager for Exchange Server installation directory is used. If the **/CONFIGfile** parameter is not specified, or if the _configfilename_ variable is not specified, the default value is tdpexc.cfg.

If the _configfilename_ variable includes spaces, enclose the entire **/CONFIGfile** parameter entry in double quotation marks. For example:

/CONFIGfile="c:\Program Files\file.cfg"

/DAGNODe=_nodename_

Specify the node name that you want to use to back up the databases in an Exchange Server Database Availability Group. With this setting, backups from all Database Availability Group members that are configured to use the DAG node are backed up to a common file space on the Tivoli Storage Manager server. The database copies are managed as a single entity, regardless of which Database Availability Group member they are backed up from. This setting can prevent Data Protection for Exchange Server from making too many backups of the same database.

/FROMEXCSERVer=_server-name_

Use the **/fromexcserver** parameter to specify the name of the Exchange Server where the original backup was processed.

The default is the local Exchange Server.

If a DAG node is specified by using the **dagnode** parameter, Tivoli Storage FlashCopy Manager for Exchange Server uses this node name instead of the Tivoli Storage FlashCopy Manager for Exchange Server node to back up databases in an Exchange Server Database Availability Group. Therefore, the **delete** command automatically deletes the backups that are created by the other DAG members, without having to specify the **/fromexcserver** parameter.

/INTO=_path_

Use the **/INTO** parameter to specify the root directory where files are to be restored. The **restorefiles** operation creates a subdirectory under the root directory that contains the name of the database. Restored files are placed in that subdirectory. If the **/INTO** parameter is not specified, the files are restored into the directory where the **restorefiles** command is issued.

/LOGFile=_logfilename_

Use the **/LOGFile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager for Exchange Server.

The _logfilename_ variable identifies the name of the activity log file.

If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The _logfilename_ variable can include a fully qualified path. However, if no path

is specified, the log file is written to the Tivoli Storage FlashCopy Manager
for Exchange Server installation directory.

If the *logfilename* variable includes spaces, enclose the entire **/LOGFile**
parameter entry in double quotation marks. For example:

```
/LOGFile="c:\Program Files\mytdpexchange.log"
```

If the **/LOGFile** parameter is not specified, log records are written to the
default log file, tdpexc.log.

The **/LOGFile** parameter cannot be turned off, logging always occurs.

When you use multiple simultaneous instances of Tivoli Storage FlashCopy
Manager for Exchange Server to run operations, use the **/LOGFile**
parameter to specify a different log file for each instance used. This
function directs logging for each instance to a different log file and
prevents interspersed log file records. Failure to specify a different log file
for each instance can result in unreadable log files.

/LOGPrune=*numdays*|**No**

When you prune log data, you can discard some of the generated logs
according to detailed filtering criteria that you set. Depending on the
option that you set for the **/LOGPrune** parameter, a certain number of days
of data are saved. By default, *60* days of log entries are saved. The option
No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly
request log pruning at any time.

Considerations:
- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in
  the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the
  logprune configurable option in the configuration file. The default value
  is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is
  stored in the configuration file. Specifying this parameter does not
  change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case,
  the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can
  result in an unwanted pruning of the log file. If you are running a
  command that might prune the log file, and the value of the **TIMEformat**
  or **DATEformat** parameter is changed, complete one of the following to
  prevent unintentional pruning of the log file:
  – Make a copy of the existing log file.
  – Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/MOUNTWait=Yes | No
Use the **/mountwait** parameter to specify whether Data Protection for
Exchange Server waits for removable media to mount (such as tapes or
CDs) or to stop the current operation. This situation occurs when the Tivoli
Storage Manager server is configured to store backup data on removable
media and waits for a required storage volume to be mounted.

You can specify these options:

Yes   Data Protection for Exchange Server waits until all initial volumes of any required removable media are made available to the Tivoli Storage Manager server before it completes the command. This option is the default.

No   Data Protection for Exchange Server ends the command (if removable media are required). An error message is displayed.

/OBJect=_object_

Use the **/OBJect** parameter to specify the name of the backup object files that you want to restore. The object name uniquely identifies each backup object and is created by Tivoli Storage FlashCopy Manager for Exchange Server.

Use the Tivoli Storage FlashCopy Manager for Exchange Server **query tsm * /all** command to view the names of the backup objects.

/Quiet   This parameter prevents status information from being displayed. The level of information that is written to the activity log is not affected.

/FCMOPTFile=_dsm.opt filename_

Use the _tsmoptfilename_ variable to identify the Tivoli Storage FlashCopy Manager for Exchange Server options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Tivoli Storage FlashCopy Manager for Exchange Server is installed is searched.

If the _tsmoptfilename_ variable includes spaces, enclose the entire _dsm.opt filename_ parameter entry in double quotation marks. For example:

`/fcmoptfile="c:\Program Files\file.opt"`

The default is _dsm.opt_.

Restoremailbox command

To restore mailbox-level data or mailbox-item-level data from Tivoli Storage FlashCopy Manager for Exchange Server backups, use the **restoremailbox** command.

The **restoremailbox** command applies to any Data Protection for Exchange Server VSS backups:

- VSS backups that are stored on Tivoli Storage Manager server
- VSS backups that are stored on local shadow volumes

When you use the **restoremailbox** command, follow these guidelines:

- Ensure that you have the required role-based access control (RBAC) permissions to complete individual mailbox restore operations.
- You can restore multiple mailboxes in a single mailbox restore operation.
- You can use the **restoremailbox** command to restore data to a mailbox on the Exchange Server or to an Exchange Server .pst file.

  When you restore to a Unicode .pst file, except for the **Folder Name** and **All Content** filters, the filters are ignored. The amount of time that is needed to complete the restore process depends on the size of the mailbox databases, the network speed, and the number of mailboxes to process.

  For non-Unicode .pst files, you can limit the range of the mailbox data to restore by using the **/mailboxfilter** parameter to specify filters that are based on the following mailbox message elements:

- Sender name
- Folder name
- Message body
- Subject line
- Attachment name
- Range of the message delivery date and time

- In Exchange 2013, you can use the **restoremailbox** command to 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, you 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 can restore to a different public folder mailbox than the original mailbox if, for example, the public folder was relocated since 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 use the **restoremailbox** command to restore an archive mailbox or only a part of the mailbox, for example, a specific folder. You can restore archive mailbox messages to an existing mailbox on the Exchange server, to an archive mailbox, or to an Exchange Server .pst file.

- You can use the **restoremailbox** command with the following parameter and options:
  - Set the **/KEEPRDB** parameter option to Yes to retain a recovery database after one or more mailboxes are restored. Set the parameter value to No to automatically remove the recovery database after mailbox restore processing.

    Regardless of the option that you set, retains the recovery database if the mailbox restore operation fails after the recovery database is successfully restored.

    If you restore multiple mailboxes, and you want to retain the recovery database after the restore operation is complete, ensure that all mailboxes are in the same recovery database.
  - Set the **/USEEXISTINGRDB** parameter option to Yes to restore a mailbox from an existing recovery database. Set the parameter value to No to automatically remove the existing recovery database during mailbox restore processing.
  - Set the **/mailboxoriglocation** parameter to specify the server and the database where the mailbox is at the time of backup. You set this option

when the mailbox history is disabled and when the mailbox that you are restoring is either moved or deleted since the time of the backup.

– If a mailbox is deleted or re-created since the time of the backup, you must use a temporary mailbox with enough capacity to contain all of the mailbox items that you are restoring. The mailbox of the user who is logged in is used as temporary mailbox by default.

You can set the **/tempmailboxalias** optional parameter by selecting **Properties** from the Actions pane. In the **Data Protection Properties** window, select the **General** page, where you can specify the temporary log restore path, the temporary database restore path and the alias of the temporary mailbox.

- You can use the **restoremailbox** command on the primary Exchange Server or on an alternate Exchange Server that is in the same domain.

Related concepts:

"Security requirements for Microsoft Exchange Server data" on page 18

Related tasks:

"Restoring mailbox data" on page 163

Restoremailbox syntax

Use the **restoremailbox** command syntax diagram as a reference to view available options and truncation requirements.

TDPEXCC command

```
                                    ┌─ , ──────────────────┐
▶▶──TDPEXCC──RESTOREMailbox──▼──original-mailboxname──┴──────────────────────▶
                                  └─original-mailboxnameN─┘

                                    ┌─local Client Access Server─┐
▶───┬──────────────────────────────────────────────────────────┬────────────▶
    └─/CLIENTACcessserver=─┴─client-access-server-name─┘

          ┌─tdpexc.cfg──────┐
▶───┬─/CONFIGfile=─┴─────────────────┬───┬─/DAGNODE=─nodename─┐  └─/FROMArchive─┘──▶
    └──────────────└─configfilename─┘

          ┌──=dsm.opt──────────┐        ┌─No──┐
▶───┬─/FCMOPTFile─┴─────────────────────┬───┬─/KEEPRDB=─┴─────┬──────────────▶
    └────────────└─=dsmoptfilename─┘     └──────────└─Yes─┘

                                              ┌─60──────┐
▶───┬─────────────────────────────┬──/LOGPrune=─┼─numdays─┤──────────────────▶
    └─/LOGFile=─┬─tdpexc.log──┬─┘                └─No──────┘
               └─logfilename─┘
```

```
>>-+----------------------------------------------------------------------+->
   |                        (1)                                           |
   '-/MAILBOXFILTER=--+-ATTACHMENTNAME--,attachmentname-search-text-+-'
                      +-ENDDATETIME--,end-date-----------------------+
                      |                        '-,end-time-'         |
                      +-FOLDER--,original-folder-name----------------+
                      +-MESSAGEBODY--,messagebody-search-text--------+
                      +-SENDER--,sender-name------------------------+
                      +-STARTDATETIME--,start-date-------------------+
                      |                           '-,start-time-'    |
                      +-SUBJECT--,subject-search-text---------------+
                      '-ALLCONTENT--,allcontent-search-text---------'

>--+--------------------------------------------------+----------------->
   '-/MAILBOXORIGLOCATION=--server-name,db-name-'

>--+------------------------------------+--+---------------------------------+->
   '-/MAILBOXRESTOREDAte=--restore-date-'  '-/MAILBOXRESTORETime=--restore-time-'

>--+------------------------------------------------------------------+->
   '-/MAILBOXRESTOREDESTination=--| /MAILBOXRESTOREDESTination options |-'

>--+-----------------------------------+--+--------+--+----------------------------+->
   '-/MAILBOXRestoreunread=--+-Yes-+-'   '-/Quiet-'  '-/TEMPDBRESTorepath=--path-name-'
                             '-No--'

>--+---------------------------------+--+---------------------------------------+->
   '-/TEMPLOGRESTorepath=--path-name-'   '-/TEMPMAILBOXAlias=--tempmailbox-alias-'

>--+-------------------------+------------------------------------------><
   '-/USEEXISTINGRDB=--+-Yes-+-'
                       '-No--'
```

/MAILBOXRESTOREDESTination options:

```
|--+-ARCHIVEMAILBOX--+---------------------------------------------+-+--|
   |                 '-,target-mailboxname--+-----------------+-'   |
   |                                        '-,target-foldername-'  |
   +-EXCHANGE--+---------------------------------------------+------+
   |           '-,target-mailboxname--+-----------------+-'        |
   |                                  '-,target-foldername-'       |
   +-PST--,non-Unicode-pst-filename-path--------------------------+
   '-UNICODEPST--,Unicode-pst-filename-path----------------------'
```

Notes:

1   You can specify the **/MAILBOXFILTER** parameter multiple times; however, you
    must specify each **/MAILBOXFILTER** subparameter only once.

Restoremailbox positional parameters

Positional parameters immediately follow the **restoremailbox** command and precede the optional parameters.

original-mailboxname

> Use this parameter to specify the name of the mailbox to restore from. The mailbox name can be either the mailbox-alias, the mailbox-display name, or the mailbox globally unique identifier (GUID). The *original-mailboxname* parameter is required.
>
> To specify more than one name, separate them by commas.
>
> If any mailbox name contains commas or blank spaces, enclose the entire mailbox name in double quotation marks.

Restoremailbox optional parameters

Optional parameters are supplied following the **restoremailbox** command and positional parameters.

/CLIENTACcessserver=*configfilename*

> Use the **/CLIENTACcessserver** parameter to specify the name of the Client Access Server (CAS) that you want to use. This parameter is available only if you use Microsoft Exchange 2010 or later versions.
>
> By default, Tivoli Storage FlashCopy Manager uses the local server as the CAS if the CAS role is installed on the local server. If the CAS role is not installed on the local server, Tivoli Storage FlashCopy Manager uses the mailbox database that the user is logged in to.
>
> To determine the name of the CAS in use, run this Exchange Management Shell command:
>
> ```
> Get-MailboxDatabase -Identity <logon user mailbox database> |
> select RpcClientAccessServer
> ```
>
> You can also specify a different CAS.

/CONFIGfile=*configfilename*

> Use the **/CONFIGfile** parameter to specify the name of the Tivoli Storage FlashCopy Manager for Exchange Server configuration file that contains the values for the Tivoli Storage FlashCopy Manager for Exchange Server configuration options.
>
> The *configfilename* variable can include a fully qualified path. If the *configfilename* variable does not include a path, the Tivoli Storage FlashCopy Manager for Exchange Server installation directory is used. If the **/CONFIGfile** parameter is not specified, or if the *configfilename* variable is not specified, the default value is tdpexc.cfg.
>
> If the *configfilename* variable includes spaces, enclose the entire **/CONFIGfile** parameter entry in double quotation marks. For example:
>
> ```
> /CONFIGfile="c:\Program Files\file.cfg"
> ```

/DAGNODe=*nodename*

> Specify the node name that you want to use to back up the databases in an Exchange Server Database Availability Group. With this setting, backups from all Database Availability Group members that are configured to use the DAG node are backed up to a common file space on the Tivoli Storage Manager server. The database copies are managed as a single entity, regardless of which Database Availability Group member they are backed up from. This setting can prevent Data Protection for Exchange Server from making too many backups of the same database.

/FCMOPTFile=*dsmoptfilename*

    The **/FCMOPTFile** parameter specifies the Tivoli Storage FlashCopy Manager options file to use.

- The *dsmoptfilename* variable can include a fully qualified path. If you do not include a path, the Tivoli Storage FlashCopy Manager installation directory is used.
- If the *dsmoptfilename* variable spaces, enclose it in double quotation marks.
- If you do not specify **/FCMOPTFile**, the default value is dsm.opt.
- If you specify **/FCMOPTFile** but not *dsmoptfilename*, the default is also dsm.opt.

/FROMArchive

    Use the **/FROMArchive** parameter only if you are restoring an archive mailbox and you specify the mailbox alias of the primary mailbox. If you specify the primary mailbox alias and you do not specify this parameter option, by default, the primary mailbox is restored.

    To restore an archive mailbox to another archive mailbox, specify both the /FROMArchive and the /MAILBOXRESTOREDESTination=ARCHIVEMAILBOX,*target-mailboxname* parameters. For example:

```
tdpexcc restoremailbox "OriginalArchiveMailboxName" /FROMArchive
/MAILBOXRESTOREDESTination=ARCHIVEMAILBOX,"TargetArchiveMailboxName"
```

/KEEPRDB=No|Yes

    Use the **/KEEPRDB** parameter to specify whether Tivoli Storage FlashCopy Manager retains a recovery database for reuse in mailbox restore operations, or automatically removes the recovery database after mailbox restore operations.

    You can specify the following values:

No   Do not retain a recovery database for mailbox restore operations. Remove the recovery database after mailbox restore processing. This option is the default.

Yes   Retain the recovery database for mailbox restore operations.

/LOGFile=*logfilename*

    Use the **/LOGFile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager for Exchange Server.

    The *logfilename* variable identifies the name of the activity log file.

    If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *logfilename* variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager for Exchange Server installation directory.

    If the *logfilename* variable includes spaces, enclose the entire **/LOGFile** parameter in double quotation marks. For example:

```
/LOGFile="c:\Program Files\mytdpexchange.log"
```

    If you do not specify the **/LOGFile** parameter, log records are written to the default log file, tdpexc.log.

    The **/LOGFile** parameter cannot be turned off, logging always occurs.

When you use multiple simultaneous instances of Tivoli Storage FlashCopy Manager for Exchange Server to run operations, use the **/LOGFile** parameter to specify a different log file for each instance that is used. This function directs logging for each instance to a different log file and prevents interspersed log file records.

Failure to specify a different log file for each instance can result in unreadable log files.

/LOGPrune=_numdays_ | **No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, some days of data are saved. By default, _60_ days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:
- For _numdays_, the range is _0_ to _9999_. A value of _0_ deletes all entries in the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is _60_.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying _numdays_ or _no_; in this case, the default value, _60_, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/MAILBOXFILTER=ATTACHMENTNAME | **ENDDATETIME** | **FOLDER** |
MESSAGEBODY | **SENDER** | **STARTDATETIME** | **SUBJECT** | **ALLCONTENT**
Use the **/MAILBOXFILTER** parameter to specify filters to restrict what mailbox data is restored. When you are restoring to a Unicode .pst file, except for the FOLDER and ALLCONTENT filters, the filters are ignored.

You can specify multiple filters; however, you must specify each filter only one time. For each filter that you specify, a separate **/MAILBOXFILTER** parameter must be used. For example:

```
tdpexcc.exe restoremailbox dchang /MAILBOXFILTER=STARTDATETIME,07/01/2013
/MAILBOXFILTER=ENDDATETIME,07/31/2013
```

Mailbox data that matches a combination of all filters that are specified is restored. If no filters are specified, by default all data in the mailbox is restored.

Specify one of the following filters when you use this parameter:

ATTACHMENTNAME,*attachmentname-search-text*

> Use /MAILBOXFILTER=*attachmentname attachmentname-search-text* to restore only the mailbox messages that contain a match of the specified text within a message attachment name. The match is not case-sensitive. For example, an *attachmentname-search-text* of *Rob* matches the attachment name: *Rob*, *robert.txt*, *PROBE*, and *prObe.pdf*.
>
> Enclose the *attachmentname-search-text* variable in double quotation marks.
>
> The **ATTACHMENTNAME** filter does not match the attachment names of encrypted mailbox messages. If a mailbox message is encrypted, it is skipped by the **ATTACHMENTNAME** filter.

ENDDATETIME,*end-date[,end-time]*

> Use /MAILBOXFILTER=enddatetime,*end-date[,end-time]* to restore only the mailbox messages that are sent or received earlier than the specified date and time.
>
> The *end-date* variable is required. Use the same date format for the *end-date* that you selected with the DATEFORMAT option in the Tivoli Storage FlashCopy Manager options file.
>
> The *end-time* variable is optional. Use the same time format for the *end-time* variable that you selected with the TIMEFORMAT option in the Tivoli Storage FlashCopy Manager options file.
> The ENDDATETIME filter date and time must be later than the STARTDATETIME filter date and time. If no time is specified, all messages that are sent or received on that date is restored.

FOLDER,*folder-name*

> Use /MAILBOXFILTER=folder,*original-folder-name* to restore only the mailbox messages that are in the specified folder within the original mailbox. The match is not case-sensitive.
>
> Enclose the *original-folder-name* variable in double quotation marks.
>
> If you use this parameter to filter a public folder to restore, ensure that you are restoring the folder to an existing public folder that has the same folder path as the public folder to be restored. If the original public folder is deleted after the time of the backup, re-create the public folder. Specify the full path to the folder. If the full directory path includes spaces, enclose the directory path in double quotation marks, and do not append a backslash character (\) at the end of the directory path.
>
> For example, to restore a folder that is named *"SubFolder"* under *"ParentFolder"*, specify *"ParentFolder/SubFolder"* as the folder path. To restore all folders in a parent folder, use *ParentFolder/*.
>
> If you use this parameter to restore a specific folder in an archive mailbox, ensure that you specify the full directory path to the folder.
>
> To restore an archive mailbox to another archive mailbox, you must specify both the /MAILBOXFILTER=folder,*original-folder-name* parameter and the /MAILBOXRESTOREDESTination=ARCHIVEMAILBOX,*target-mailboxname* parameter. For example:

```
tdpexcc restoremailbox "OriginalArchiveMailboxName"
/MailboxFilter=folder,"/folderA" /MAILBOXRESTOREDESTination=
ARCHIVEMAILBOX,"TargetArchiveMailboxName"
```

To restore the folder of a mailbox to a Unicode `.pst` file, you must specify the /MAILBOXFILTER=FOLDER parameter with the /MAILBOXRESTOREDESTination=UNICODEPST parameter. Specify the full directory path to the folder. For example, to restore a folder that is named *"SubFolder"* under *"ParentFolder"*, specify *"ParentFolder/SubFolder"* as the folder path. To restore all folders in a parent folder, use *ParentFolder/**.

MESSAGEBODY,*messagebody-search-text*

Use /MAILBOXFILTER=messagebody,,*messagebody-search-text* to restore only the mailbox messages that contain a match of the specified text within the message body. The match is not case-sensitive. For example, a ,*messagebody-search-text* of *Rob* matches the message body text: *Rob*, *robert*, *PROBE*, and *prObe*.

Enclose the *messagebody-search-text* variable in double quotation marks.

The MESSAGEBODY filter does not match the message body of encrypted mailbox messages. If a mailbox message is encrypted, it is skipped by the MESSAGEBODY filter.

SENDER,*sender-name*

Use /MAILBOXFILTER=sender,,*sender-name* to restore only the mailbox messages that are received from the specified message sender.

Enclose the *sender-name* variable in double quotation marks.

STARTDATETIME,*start-date[,start-time]*

Use /MAILBOXFILTER=startdatetime,*start-date[,start-time]* to restore only the mailbox messages that are sent or received after the specified date and time.

The *start-date* variable is required. Use the same date format for the *start-date* that you selected with the DATEFORMAT option in the Tivoli Storage FlashCopy Manager options file.

The *start-time* variable is optional. Use the same time format for the *start-time* variable that you selected with the TIMEFORMAT option in the Tivoli Storage FlashCopy Manager options file.

The STARTDATETIME filter date and time must be earlier than the ENDDATETIME filter date and time. If no time is specified, all messages that are sent or received on that date is restored.

SUBJECT,*subject-search-text*

Use /MAILBOXFILTER=subject,,*subject-search-text* to restore only the mailbox messages that contain a match of the specified text within the message subject line. The match is not case-sensitive. For example, a *subject-search-text* of *Rob* matches the subject text: *Rob*, *robert*, *PROBE*, and *prObe*.

Enclose the *subject-search-text* variable in double quotation marks.

ALLCONTENT,*allcontent-search-text*

Use /MAILBOXFILTER=allcontent,*allcontent-search-text* to restore only the mailbox messages that contain a match of the specified text that is contained within the message sender, the message

subject line, or the message body. The match is not case-sensitive. For example, an *allcontent-search-text* of *Rob* matches *Rob*, *robert*, *PROBE*, and *prObe* contained within the attachment name, message sender, the subject line, or the message body.

Enclose the *allcontent-search-text* variable in double quotation marks.

The `ALLCONTENT` filter does not match the message body of encrypted mailbox messages. If a mailbox message is encrypted, the `ALLCONTENT` filter matches only text that is contained within the message sender or the subject line.

/MAILBOXORIGLOCATION=*server-name,db-name*

Use the **/MAILBOXORIGLOCATION** parameter to specify the Exchange Server and the database where the mailbox is at the time of backup.

If you do not specify the **/MAILBOXORIGLOCATION** parameter, the default value is the location (found in the mailbox location history) of the mailbox to restore from, for the backup time specified. If no mailbox location history is available, the default value is the current active location of the mailbox.

server-name
> The name of the Exchange Server where the mailbox is at the time of backup.

db-name
> The name of the database where the mailbox is at the time of backup.

The **/MAILBOXORIGLOCATION** parameter is only necessary if the mailbox to be restored from is moved or deleted after the time of the backup, and no mailbox location history is available.

A **restoremailbox** operation from a backup that is selected with Tivoli Storage FlashCopy Manager for Exchange Server before version 6.1 fails if the **/MAILBOXORIGLOCATION** parameter is not specified for mailboxes that meet one or both of the following the conditions:

- The mailbox to be restored is moved. (The mailbox is not in the same server and the same database where the mailbox is at the time of backup).
- The mailbox to be restored is deleted and the restore destination is to an alternate mailbox or to a .pst file.

For example:
```
TDPEXCC RESTOREMAILBOX annjones
/MAILBOXORIGLOCATION=serv1,mbdb1
/MAILBOXRESTOREDAte=12/31/2013
/MAILBOXRESTOREDESTination=PST,c:\team99\rcvr.pst
```

/MAILBOXRESTOREDAte=*restore-date*

Use the **/MAILBOXRESTOREDAte** parameter with or without the **/mailboxrestoretime** parameter to establish a date and time to restore mailbox data from. A mailbox is restored from the earliest backup that is selected after the date and time that is established by the **/MAILBOXRESTOREDAte** and the **/mailboxrestoretime** parameters. Specify the appropriate date in the *restore-date* variable; use the same format that you selected with the `DATEFORMAT` option in the Tivoli Storage FlashCopy Manager for Exchange Server options file.

If *restore-date* or*restore-time* values are not specified, no date and time is established. By default the mailbox is restored from the most recent available backup.

If either *restore-date* or *restore-time* is specified, then the mailbox is restored from the earliest backup that is selected after the established restoration date and time. If no backup of the mailbox after the established date and time is found, by default the mailbox will be restored from the most recent available backup.

- If you specify both *restore-date* or *restore-time*, this action establishes the mailbox restoration period.
- If you specify *restore-date* and you do not specify *restore-time*, *restore-time* defaults to a value of *23:59:59*. This action establishes the *restore-date* at the specified date.
- If you specify *restore-time* without *restore-date*, then *restore-date* defaults to the current date. This setting establishes the restoration date and time as the current date at the specified *restore-time*.

/MAILBOXRESTORETime=*restore-time*

Use the **/MAILBOXRESTORETime** parameter with or without the **/MAILBOXRESTOREDAte** parameter to establish a date and time to restore a mailbox from. A mailbox is restored from the earliest backup that is selected after the date and time that is established by the **/MAILBOXRESTOREDAte** and the **/MAILBOXRESTORETime** parameters. Specify the appropriate time in the *restore-time* variable; use the same format that you selected with the TIMEFORMAT option in the Tivoli Storage FlashCopy Manager for Exchange Server options file.

If *restore-date* and *restore-time* values are not specified, no date and time is established. By default the mailbox is restored from the most recent available backup.

If either *restore-date* or *restore-time* is specified, the mailbox is restored from the earliest backup that is selected after the established date and time. If no backup of the mailbox after the established date and time is found, by default the mailbox is restored from the most recent available backup.

- If you specify both *restore-date* and *restore-time*, this function establishes the mailbox restoration period.
- If you specify *restore-date* and you do not specify *restore-time*, *restore-time* defaults to a value of *23:59:59*. This function establishes the *restore-date* at the specified date.
- If you specify *restore-time* without *restore-date*, the *restore-date* variable defaults to the current date. This function establishes the restoration date and time as the current date at the specified *restore-time*.

/MAILBOXRESTOREDESTination=ARCHIVEMAILBOX|EXCHANGE|PST|UNICODEPST

Use the **/mailboxrestoredestination** parameter to specify the destination to restore the mailbox data to.

If you do not specify the **/mailboxrestoredestination** parameter, the default system behavior is to restore mailbox data to the original location in the original active mailbox. When you restore multiple mailboxes with the same **restoremailbox** command, the default system behavior is to restore mailbox data into each original active mailbox.

Mailbox items are merged into the mailbox destination. If a mailbox item exists in the mailbox destination, that item is not restored.

You must specify one of the following values when you use this parameter:

ARCHIVEMAILBOX,[*target-mailboxname***,***target-foldername***]**
> Use the **/MAILBOXRESTOREDESTination** ARCHIVEMAILBOX and **/FROMARCHIVE** parameters to restore archive mailbox messages to its original archive mailbox or to an alternate archive mailbox.
>
> Use /MAILBOXRESTOREDESTination=ARCHIVEMAILBOX,*target-mailboxname* to specify the archive mailbox destination that you want to restore to. You can also specify a target folder name in the archive mailbox.
>
> To restore an archive mailbox into a specific folder of an archive mailbox, specify both the /FROMArchive parameter and the /MAILBOXRESTOREDESTination=ARCHIVEMAILBOX,*target-mailboxname*,*target-foldername* parameters. For example:
>
> ```
> tdpexcc restoremailbox "OriginalFolderName" /FROMArchive
> /MAILBOXRESTOREDESTination=ARCHIVEMAILBOX,"TargetFolderName"
> "/folderA"
> ```
>
> If you specify the /MAILBOXRESTOREDESTination=ARCHIVEMAILBOX parameter without specifying a target mailbox destination, the mailbox messages are restored to the original location in the original archive mailbox.

EXCHANGE,[*target-mailboxname***,***target-foldername***]**
> Use the **/mailboxrestoredestination** EXCHANGE option to restore mailbox messages into a live Exchange Server.
>
> If you specify the **/mailboxrestoredestination** EXCHANGE option without specifying any variables, /mailboxrestoredestination=EXCHANGE, the result is the same as not specifying the **/mailboxrestoredestination** parameter. The mailbox data is restored to the original location in the original active mailbox.
>
> Use /mailboxrestoredestination=EXCHANGE,*target-mailboxname*,*target-foldername* to restore mailbox messages into a destination other than the original location in the original active mailbox. The mailbox messages are restored into a subfolder of the specified folder within the target mailbox. The target mailbox can be the original mailbox or an alternate mailbox.
>
> When you restore multiple mailboxes with the same **restoremailbox** command, this option restores the mailbox data into a subfolder (designated by each original mailbox-alias) of the specified target folder in the active mailbox. The folders from the corresponding original mailbox, which contain the restored mailbox messages, are in each subfolder. The specified folder in the target mailbox contains a subfolder that is designated by the original mailbox alias name. Subfolders that contain the restored mailbox messages are in each parent subfolder. These child subfolders have the folder structure of the original mailbox.
>
> *target-mailboxname*
>
>> Specify the target mailbox-alias or the target mailbox-display name. The target mailbox must be an active mailbox.
>>
>> If the *target-mailboxname* variable includes spaces, enclose the entry in double quotation marks.

To restore a specific public folder to an alternate public
folder mailbox, specify both the
/MAILBOXFILTER=folder,*original-folder-name* parameter
and the /MAILBOXRESTOREDESTination=EXCHANGE,*target-*
publicfolder-mailboxname parameter. For example:

```
tdpexcc restoremailbox "OriginalPublicFolderMailbox"
/MailboxFilter=folder,"/folderA" /MAILBOXRESTOREDESTination=
EXCHANGE,"TargetPublicFolderMailbox"
```

You can restore a public folder only to an existing public
folder on the Exchange server. If the public folder is
relocated to an alternate mailbox destination after the time
of the backup, ensure that it exists in the alternate mailbox
location with the same folder path as the folder to be
restored. The restore operation does not automatically
re-create the public folder in the destination mailbox.

target-foldername

The *target-foldername* variable specifies the mailbox folder in
the target mailbox to restore mailbox messages to.

If you specify the *target-mailboxname* variable and the target
mailbox is not the original mailbox, you must specify a
folder name. However, when you restore to a mailbox in a
target public folder, do not specify a target folder name. A
folder name is not required for public folder restore
operations.

If the mailbox folder specified by the *target-foldername*
variable does not exist in the target mailbox, a folder with
the target folder name is created in the target mailbox
except for public folder mailboxes.

The target folder contains one subfolder for each
original-mailbox that is restored (designated by each
original-mailbox alias). The folders from the corresponding
original mailbox, which contain the restored mailbox
messages, are in each subfolder. If you did not specify the
/mailboxfilter parameter, the target folder that you
specified contains, within the subfolder that is designated
by the original mailbox alias, all the folders that are in the
mailbox that you are restoring from. If you specified the
/mailboxfilter parameter, the subfolder within the folder
that you specified contains only the folders with messages
that match the filter criteria.

If the *target-foldername* variable includes spaces, enclose the
entire *target-foldername* variable entry in double quotation
marks. For example:

```
/MAILBOXRESTOREDESTination=EXCHANGE,Kerry,"temp folder"
```

When you restore multiple mailboxes with the same
restoremailbox command, and you specify a target folder,
each original-mailbox is restored to the target folder in the
target mailbox. The target folder contains one subfolder for
each original-mailbox that is restored (designated by each
original mailbox alias). The folders from the corresponding
original mailbox, which contain the restored mailbox
messages, are in each subfolder.

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For example, this **restoremailbox** operation restores mailboxes "andrew baker" and "sally wood" to the folder "previous_acctmngr" in the target mailbox "mary brown":

```
restoremailbox "andrew baker","sally wood"
/mailboxrestoredest=exchange,"mary brown",previous_acctmngr
```

The restored mailbox messages are placed in folders that are copied from the original mailboxes that use the following folder structure:

```
mary brown (target mailbox)
        >-previous_acctmngr     (specified folder)
           >-abaker             (original-mailbox1 alias)
            │ >-Inbox     (restored folder from mailbox1)
            │ >-Outbox    (restored folder from mailbox1)
            │ >-My Accts  (restored folder from mailbox1)
           >-swood              (original-mailbox2 alias)
            │ >-Inbox     (restored folder from mailbox2)
            │ >-Outbox    (restored folder from mailbox2)
            │ >-New Accnts (restored folder from mailbox2)
```

PST,*non-Unicode-pst-filename-path*

Use /mailboxrestoredestination=PST,*non-Unicode-pst-filename-path* to restore mailbox data to an Exchange Server personal folders (.pst) file. The mailbox data that is restored is in non-Unicode format.

You can include the *non-Unicode-pst-filename-path* variable to specify the destination where the **restoremailbox** operation writes the .pst file. The *non-Unicode-pst-filename-path* can be either a fully qualified path to a .pst file or a directory path. If you do not specify a path, the .pst file is written to the current directory.

- You can specify *non-Unicode-pst-filename-path* as a fully qualified path to a .pst file to restore all mail to that .pst file.

```
TDPEXCC RESTOREMAILBOX gclark
  /mailboxrestoredestination=PST,c:\mb\dept54\vpo.pst
```

Note: The .pst directory must exist before you use the **restoremailbox** command. The .pst file is created if it does not exist.

If you are restoring more than one mailbox and you specify a fully qualified path to a .pst file, all the mailbox data is restored to the one .pst file specified. Inside the .pst file, the parent-level folder name is the mailbox-alias-name, followed by the rest of the mailbox folders.

- You can specify *non-Unicode-pst-filename-path* as a directory path to have Tivoli Storage FlashCopy Manager for Exchange Server create a .pst file by using the mailbox-alias-name of the mailbox that is being restored, and store the .pst file in the specified directory. For example, the .pst file name of the restored mailbox "George Clark"(gclark) is gclark.pst.

```
TDPEXCC RESTOREMAILBOX "george clark"
  /mailboxrestoredestination=PST,c:\mb\dept54\
```

The .pst directory must exist before you use the **restoremailbox** command. If the .pst file does not exist, the file is created.

If you restore multiple mailboxes with the same **restoremailbox** command, and you specify a directory path, each mailbox is restored into a separate .pst file. For example, if mailboxes John

(john1), John Oblong (oblong), and Barney Olef (barneyo) are restored and the specified directory path is c:\finance, all mailboxes are restored into the c:\finance directory as shown:

```
c:\finance\john1.pst
c:\finance\oblong.pst
c:\finance\barneyo.pst
```

The .pst directory must exist before you use the **restoremailbox** command. The mailbox data that is restored by using /mailboxrestoredestination=PST,*non-Unicode-pst-filename-path* must be less than 2 GB.

If the *non-Unicode-pst-filename-path* variable includes spaces, enclose the entire *non-Unicode-pst-filename-path* variable entry in double quotation marks and do not append a backslash character (\) at the end of folder path. For example:

```
TDPEXCC RESTOREMAILBOX "george clark"
   /mailboxrestoredestination=PST,"c:\mb\dept54\access group"
```

UNICODEPST,*Unicode-pst-filename-path*

Use /mailboxrestoredestination=UNICODEPST,*Unicode-pst-filename-path* to restore mailbox data to an Exchange Server personal folders (.pst) file. The mailbox data that is restored is in Unicode format.

You can include the *Unicode-pst-filename-path* variable to specify the destination where the **restoremailbox** operation writes the .pst file. The *Unicode-pst-filename-path* can be either a fully qualified UNC path to a .pst file or a directory path. If you do not specify a path, the .pst file is written to the current directory. If you specify a non-UNC path (such as c:\dir\mailbox.pst), Tivoli Storage FlashCopy Manager for Exchange Server tries to convert it to a UNC path for you, but it might not work for custom UNC paths or shares.

- You can specify *Unicode-pst-filename-path* as a fully qualified path to a .pst file to restore all mail to that .pst file.

```
TDPEXCC RESTOREMAILBOX gclark
   /mailboxrestoredestination=UNICODEPST,c:\mb\dept54\vpo.pst
```

Important: The .pst directory must exist before you use the **restoremailbox** command. The .pst file is created if it does not exist.

If you are restoring more than one mailbox and you specify a fully qualified path to a .pst file, all the mailbox data is restored to the one .pst file specified. Inside the .pst file, the parent-level folder name is the mailbox-alias-name, followed by the rest of the mailbox folders.

- You can specify *Unicode-pst-filename-path* as a directory path to have Tivoli Storage FlashCopy Manager for Exchange Server create a .pst file by using the mailbox-alias-name of the mailbox that is being restored, and store the .pst file in the specified directory. For example, the .pst file name of the restored mailbox "George Clark"(gclark) is gclark.pst.

```
TDPEXCC RESTOREMAILBOX "george clark"
   /mailboxrestoredestination=UNICODEPST,c:\mb\dept54
```

The .pst directory must exist before you use the **restoremailbox** command. If the .pst file does not exist, the file is created.

If you restore multiple mailboxes with the same **restoremailbox** command, and you specify a directory path, each mailbox is restored into a separate `.pst` file. For example, if mailboxes John (john1), John Oblong (oblong), and Barney Olef (barneyo) are restored and the specified directory path is `c:\finance`, all mailboxes are restored into the `c:\finance` directory as shown:

```
c:\finance\john1.pst
c:\finance\oblong.pst
c:\finance\barneyo.pst
```

If the *Unicode-pst-filename-path* variable includes spaces, enclose the entire *Unicode-pst-filename-path* variable entry in double quotation marks and do not append a backslash character (\) at the end of folder path. For example:

```
TDPEXCC RESTOREMAILBOX "george clark"
    /mailboxrestoredestination=UNICODEPST,"c:\mb\dept54\access group"
```

/MAILBOXRestoreunread=Yes|No

Use the **/MAILBOXRestoreunread** parameter to specify whether Data Protection for Microsoft Exchange Server marks restored mail messages as unread.

You can specify the following values:

Yes   Mark restored mail messages as unread. This option is the default.

No   Do not mark restored mail messages as unread.

/Quiet This parameter prevents the display of status information but does not affect the level of information that is written to the activity log.

/TEMPDBRESTorepath=*path-name*

Use the **/TEMPDBRESTorepath** parameter to specify the default temporary path to use when you restore mailbox database files.

If you do not specify the **/TEMPDBRESTorepath** parameter, the default value is the value that is specified by the **/TEMPDBRESTorepath** option in the Tivoli Storage FlashCopy Manager configuration file. The default Tivoli Storage FlashCopy Manager for Exchange Server configuration file is `tdpexc.cfg`. If the **/TEMPDBRESTorepath** value does not exist in the Tivoli Storage FlashCopy Manager for Exchange Server configuration file, the TEMP environment variable value is used.

If the *path-name* variable includes spaces, enclose the entire **/TEMPDBRESTorepath** parameter entry in double quotation marks. For example:

```
TDPEXCC RESTOREMAILBOX richgreene
  /tempdbrestorepath="h:\Exchange Restore Directory"
```

- Do not specify a value of **/TEMPDBRESTorepath** that is the same value as the location of the active database. If the value is the same, the database might become corrupted.
- Choose a temporary database-restore location that has enough space to hold the entire restore for the database.

For better performance, the current active-transaction logger is to be on a different physical device from the paths that are specified by the values of the **/TEMPDBRESTorepath** parameter and the **/TEMPDBRESTorepath** parameter. The paths that are specified by the values of the **/TEMPDBRESTorepath** parameter and the **/TEMPDBRESTorepath** parameter can be on the same or separate physical devices from each other.

Do not specify double-byte characters (DBCS) within the temporary database-restore path.

/TEMPLOGRESTorepath=_path-name_

Use the **/TEMPLOGRESTorepath** parameter to specify the default temporary path to use when you restore logs and patch files.

If you do not specify the **/TEMPLOGRESTorepath** parameter, the default value is the value that is specified by the **/TEMPLOGRESTorepath** option in the Tivoli Storage FlashCopy Manager configuration file. The default Tivoli Storage FlashCopy Manager for Exchange Server configuration file is tdpexc.cfg. If you do not specify the **/TEMPLOGRESTorepath** parameter and the **/TEMPLOGRESTorepath** value does not exist in the Tivoli Storage FlashCopy Manager for Exchange Server configuration file, the TEMP environment variable value is used.

- Do not specify a value of **/TEMPLOGRESTorepath** that is the same value as the current location for the database that is used for recovery. If the value is the same, the database might become corrupted.
- Choose a temporary log-restore location that has enough space to hold all the log and patch files.

For better performance, the current active-transaction logger is to be on a different physical device from the paths that are specified by the values of the **/TEMPLOGRESTorepath** parameter and the **/TEMPLOGRESTorepath** parameter. The paths that are specified by the values of the **/TEMPLOGRESTorepath** parameter and the **/TEMPLOGRESTorepath** parameter can be on the same or separate physical devices from each other.

Do not specify double-byte characters (DBCS) within the temporary log-restore path.

/TEMPMAILBOXAlias=_tempmailbox-alias_

Use the **/TEMPMAILBOXAlias** parameter to specify the mailbox-alias of a temporary mailbox to use. A temporary mailbox is used when you run mailbox restore operations on mailboxes that are deleted or re-created after the time of the backup you are restoring from. A temporary mailbox is used by the mailbox restore operations to store mailbox messages during intermediate processing. The mailbox messages are deleted from the temporary mailbox when processing is complete.

If you do not specify the **/TEMPMAILBOXAlias** parameter, the default value is the value that is specified by the **/TEMPMAILBOXAlias** option in the Tivoli Storage FlashCopy Manager configuration file. The default Tivoli Storage FlashCopy Manager for Exchange Server configuration file is tdpexc.cfg. If the **/TEMPMAILBOXAlias** value does not exist in the Tivoli Storage FlashCopy Manager for Exchange Server configuration file, the mailbox of the currently logged on user is used as the temporary mailbox.

Specify the following value when you use this parameter:

tempmailbox-alias

Specify the mailbox-alias of the temporary mailbox to use for recovery of mailboxes that are deleted or re-created after the time of the backup you are restoring from.

Ensure that the temporary mailbox is active and has enough storage capacity to accommodate all items of the mailboxes that are being restored.

If the *tempmailbox-alias* variable includes spaces, enclose the entry in double quotation marks.

/USEEXISTINGRDB=Yes|No

Use the **/USEEXISTINGRDB** parameter to specify whether Data Protection for Microsoft Exchange Server restores mailboxes from an existing recovery database, or automatically removes an existing recovery database during mailbox restore operations.

You can specify the following values:

Yes   Use an existing recovery database for mailbox restore operations. This option is the default.

No   Do not use an existing recovery database for mailbox restore operations. Remove the recovery database during mailbox restore processing.

Examples: `restoremailbox command`

You can combine the use of the **/KEEPRDB** and **/USEEXISTINGRDB** parameter options with the **restormailbox** command.

Example: Use an existing recovery database for mailbox operations
Use an existing recovery database for restore mailbox operations so that you do not have to restore the recovery database again.

`tdpexcc restoremailbox <MB> /USEEXISTINGRDB=Yes`

Example: Retain a recovery database for mailbox operations
Retain a recovery database after a mailbox restore operation so that you can use the recovery database for other restore operations.

`tdpexcc restoremailbox <MB> /KEEPRDB=YES`

Example: Retain a recovery database for multiple mailbox restore operations, and then remove it
Because you restore multiple mailboxes at different times, you want to retain the recovery database after the first mailbox restore operation and use it for subsequent restore operations. When you restore the final mailbox, you remove the recovery database.

`tdpexcc restoremailbox <MB_1> /KEEPRDB=YES`

`tdpexcc restoremailbox <MB_2> /USEEXISTINGRDB=YES`

`tdpexcc restoremailbox <MB_n> /KEEPRDB=NO`

Example: Restore multiple mailboxes simultaneously
Simultaneously restore multiple mailboxes and ensure that the recovery database is automatically removed after each mailbox is restored.

`tdpexcc restoremailbox <MB_1>,<MB_2> /KEEPRDB=NO`

Example: Restore multiple mailboxes from an existing recovery database
Simultaneously restore multiple mailboxes from an existing recovery database.

Tip: Mailboxes that are not in the recovery database are bypassed during restore processing, and are indicated in the console output.
Restore the remaining mailboxes that are not in the recovery database.

`tdpexcc restoremailbox <MB_1>,<MB_2>...<MB_n> /USEEXISTINGRDB=YES`
`/KEEPRDB=NO`

`tdpexcc restoremailbox <MB_1>,<MB_2>...<MB_n> /USEEXISTINGRDB=NO`
`/KEEPRDB=NO`

Set command

Use the **set** command to set the Tivoli Storage FlashCopy Manager for Exchange Server configuration parameters in a configuration file.

The values that you set are saved in a Tivoli Storage FlashCopy Manager for Exchange Server configuration file. The default file is tdpexc.cfg. Configuration values can also be set in the Data Protection Properties window in Microsoft Management Console (MMC).

For command invocations other than this command, the value of a configuration parameter that is specified in a command overrides the value of the configuration parameter that is specified in the Tivoli Storage FlashCopy Manager for Exchange Server configuration file. If, when you use this command, you do not override a value for the configuration file parameter, the values in the default configuration file are used.

Set syntax

Use the **set** command syntax diagrams as a reference to view available options and truncation requirements.

TDPEXCC command

```
►►─TDPEXCC─SET─BACKUPDESTINATION=──┬─LOCAL─┬──────────────────────────────►
                                   ├─TSM───┤
                                   └─BOTH──┘

►─CLIENTACcessserver=───servername──DATEformat=──┬─MM/DD/YYYY──┬────────────►
                                                 ├─DD-MM-YYYY──┤
                                                 ├─YYYY-MM-DD──┤
                                                 ├─DD.MM.YYYY──┤
                                                 ├─YYYY.MM.DD──┤
                                                 ├─YYYY/MM/DD──┤
                                                 └─DD/MM/YYYY──┘

►─LANGuage=───3-letter_country_code──LOCALDSMAGENTNODE=───nodename──────────►

                  ┌─tdpexc.log───┐           ┌─60─────┐            ┌─Yes─┐
►─LOGFile=────────┼──────────────┼─LOGPrune=─┼─0..9999─┤─MOUNTWait=┼─────┤──►
                  └─logfilename──┘           └─No─────┘            └─No──┘

                                                         ┌─Yes─┐
►─NUMberformat=──┬─1 n,nnn.dd─┬──STOREMAILBOXInfo=───────┼─────┤────────────►
                 ├─2 n,nnn,dd─┤                          └─No──┘
                 ├─3 n nnn,dd─┤
                 ├─4 n nnn.dd─┤
                 ├─5 n.nnn,dd─┤
                 └─6 n'nnn,dd─┘

►─TEMPDBRestorepath=───pathname──TEMPLOGRestorepath=───pathname─────────────►
```

```
►──TIMEformat=──┬─1 HH:MM:SS─────┬──────────────────────────────────────►◄
                ├─2 HH,MM,SS─────┤                ┌─tdpexc.cfg──────┐
                ├─3 HH.MM.SS─────┤  └──/CONFIGfile=─┤                 ├──
                └─4 HH:MM:SSA/P──┘                 └─configfilename──┘
```
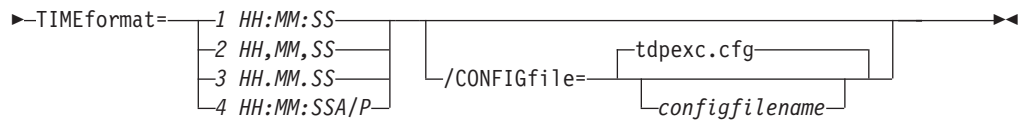
Set positional parameters

Positional parameters immediately follow the **set** command and precede the optional parameters.

The following positional parameters specify the values in the Tivoli Storage FlashCopy Manager for Exchange Server configuration file. You can set only one value for each **tdpexcc set** command run:

BACKUPDESTination=TSM|LOCAL|BOTH

> Use the **BACKUPDESTination** positional parameter to specify the storage location for your backup. You can specify:

> **TSM** The backup is stored on Tivoli Storage Manager server storage only. This option is the default.

> **LOCAL** The backup is stored on local shadow volumes only.

> **BOTH** The backup is stored on both Tivoli Storage Manager server storage and local shadow volumes.

CLIENTACcessserver=*servername*

> The *servername* variable refers to the name of the server you use to access the client.

DATEformat=*dateformatnum*

> Use the **DATEformat** positional parameter to select the format you want to use to display dates.

> The *dateformatnum* variable displays the date in one of the following formats. Select the format number that corresponds to the format you want to use.

> **1** (Default) *MM/DD/YYYY*

> **2** *DD-MM-YYYY*

> **3** *YYYY-MM-DD*

> **4** *DD.MM.YYYY*

> **5** *YYYY.MM.DD*

> **6** *YYYY/MM/DD*

> **7** *DD/MM/YYYY*

> Changes to the value of the **DATEformat** parameter can result in an undesired pruning of the Tivoli Storage FlashCopy Manager for Exchange Server log file (tdpexc.log by default). You can avoid losing existing log file data by doing one of the following choices:

> • After you change the value of the **DATEformat** parameter, make a copy of the existing log file before you run Tivoli Storage FlashCopy Manager for Exchange Server.

> • Specify a new log file with the **LOGFile** parameter.

LANGuage=*language*

Specify the three-character code of the language you want to use to display messages:

CHS   Simplified Chinese

CHT   Traditional Chinese

DEU   Standard German

ENU   (Default) American English

ESP   Standard Spanish

FRA   Standard French

ITA   Standard Italian

JPN   Japanese

KOR   Korean

PTB   Brazilian Portuguese

LOCALDSMAgentnode=*nodename*

Specify the node name of the local system that runs the VSS backups. This positional parameter must be specified for VSS operations to run.

LOGFile=*logfilename*

Use the **LOGFile** positional parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager for Exchange Server. The Tivoli Storage FlashCopy Manager for Exchange Server activity log records significant events, such as completed commands and error messages.

The *logfilename* variable identifies the name of the activity log file. If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *logfilename* variable can include a fully qualified path. However, if no path is specified, the log file is assigned to the Tivoli Storage FlashCopy Manager for Exchange Server installation directory.

/LOGPrune=*numdays* | **No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, *60* days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:
- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.

- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
    - Make a copy of the existing log file.
    - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

MOUNTWait=*Yes***|No**

Use the **MOUNTWait** positional parameter to specify whether Tivoli Storage FlashCopy Manager for Exchange Server waits for removable media to mount (such as tapes or DVDs) or to stop the current operation. This situation occurs when the Tivoli Storage Manager server is configured to store backup data on removable media and waits for a required storage volume to be mounted.

Specify *Yes* for Tivoli Storage FlashCopy Manager for Exchange Server to wait until all initial volumes of any required removable media are made available to the Tivoli Storage Manager server before you complete the command.

Specify No for Tivoli Storage FlashCopy Manager for Exchange Server to end the command (if removable media are required). An error message is displayed.

NUMberformat=*fmtnum*

Use the **NUMberformat** positional parameter to specify the format you want to use to display numbers.

The *fmtnum* variable displays numbers by using one of the following formats. Select the format number that corresponds to the format you want to use.

1 (Default) *n,nnn.dd*

2 *n,nnn,dd*

3 *n nnn,dd*

4 *n nnn.dd*

5 *n.nnn,dd*

6 *n'nnn,dd*

STOREMAILBOXInfo=Yes|No

The **STOREMAILBOXInfo** parameter is used to track mailbox history for moved and deleted mailboxes. By default, this parameter is set to Yes. If you do not plan to use mailbox restore, you can set this option to No. When the option is set to No, Tivoli Storage FlashCopy Manager for Exchange Server does not back up the mailbox history.

In large or geographically dispersed domains, more time is required to complete the backup mailbox history task. In this scenario, you can reduce the amount of time that is required to complete the backup mailbox history task by setting the option for **STOREMAILBOXInfo** to No. When you set the option for **STOREMAILBOXInfo** to No, mailboxes that are not moved or are not deleted can be restored normally. Moved and deleted mailbox restores can use the **MAILBOXORIGLOCATION** parameter (of the **restoremailbox** command) to specify the mailbox location at the time of the backup.

TEMPDBRESTorepath=*pathname*

For mailbox restore operations, use the **TEMPDBRESTorepath** positional parameter to specify the default temporary path to use when you restore mailbox database files.

If you do not enter a path, the default value is the value of the TEMP environment variable.

If the path name includes spaces, you must enclose the entire **TEMPDBRESTorepath** positional parameter entry in double quotation marks. For example:

```
TDPEXCC SET TEMPDBRESTorepath="h:\Exchange Restore Directory"
```

Do not specify a value of **TEMPDBRESTorepath** that is the same value as the location of the active database. If the value is the same, the database might become corrupted. Choose a temporary database-restore location that has enough space to hold the entire restore.

For better performance, the current active-transaction logger must be on a different physical device from the paths that are specified by the values of the **TEMPDBRESTorepath** parameter setting and the **TEMPDBRESTorepath** parameter setting. The paths that are specified by the values of the **TEMPDBRESTorepath** parameter setting and the **TEMPDBRESTorepath** parameter setting can be on the same or separate physical devices from each other.

Do not specify double-byte characters (DBCS) within the temporary database-restore path.

TIMEformat=*formatnumber*

Use the **TIMEformat** positional parameter to specify the format in which you want system time that is displayed.

The *formatnumber* variable displays time in one of the following formats. Select the format number that corresponds to the format you want to use.

1   (Default) *HH:MM:SS*

2   *HH,MM,SS*

3   *HH.MM.SS*

4   *HH:MM:SSA/P*

Set optional parameters

Optional parameters follow the **set** command and positional parameters.

/CONFIGfile=*configfilename*

Use the **/CONFIGfile** parameter to specify the name of the Data Protection for Exchange Server configuration file in which these values are set.

The *configfilename* variable can include a fully qualified path. If the *configfilename* variable does not include a path, the Data Protection for Exchange Server installation directory is used. If the **/CONFIGfile** parameter is not specified, or if the *configfilename* variable is not specified, the default value is tdpexc.cfg.

If the *configfilename* variable includes spaces, enclose the entire **/CONFIGfile** parameter entry in double quotation marks. For example:

```
/CONFIGfile="c:\Program Files\file.cfg"
```

Set example

The **tdpexcc set localdsmagentnode=mean** command sets the node *mean* as the node name of the local system that processes the backups.

Specify the node name of the local system that processes the VSS backups. When the command completes, the following message is displayed:

```
FMX5054I The preference has been set successfully.
```

Unmount backup command

Use the **unmount backup** command to unmount backups that were previously mounted, and are managed by Tivoli Storage FlashCopy Manager for Exchange Server.

Unmount backup syntax

Use the **unmount backup** command syntax diagrams as a reference to view available options and truncation requirements.

TDPEXCC command

►►──TDPEXCC──UNMOUNT BACKup──*mount point root directory*─────────────────►

►─┬────────────────────────────────────┬─┬──────────────────────────┬─►
  │ ┌─tdpexc.xml─────┐   │ │ ┌─tdpexc.log────┐   │
  └─/CONFIGfile=─┼────────────────┼─────┘ └─/LOGFile=─┼───────────────┼─┘
                 └─*configfilename*─┘   └─*logfilename*─┘

►─┬─────────────────────────┬───►
  │   ┌─60────┐   │
  └─/LOGPrune=─┼─*numdays*─┼─┘ └─/REMOTECOMPUTER=──*computername*─┘
              └─No────┘

►─┬─────────────────────────────────┬─┬───────────────────────────────────┬─►
  └─/REMOTECOMPUTERUser=──*user*─┘   └─/REMOTECOMPUTERPassword=──*passwd*─┘

►─┬───────────────────────────────┬─┬──────────────────────────────────┬─►
  └─/TSMNODe=──*tsmnodename*─┘   │ ┌─dsm.opt──────────┐   │
                                  └─/TSMOPTFile=─┼──────────────────┼─┘
                                                └─*tsmoptfilename*─┘

►─┬───────────────────────────────┬───────────────────────────────────►◄
  └─/TSMPassword=──*tsmpassword*─┘
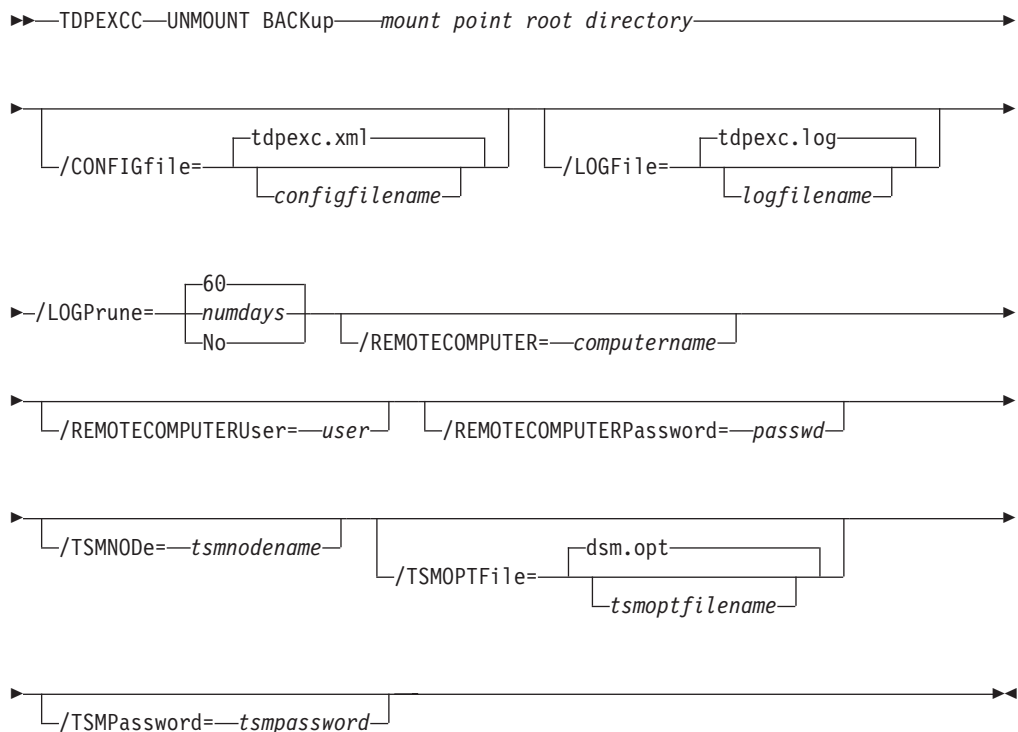
Unmount backup positional parameter

The positional parameter immediately follows the **unmount backup** command and precedes the optional parameters.

mount points root directory
> Absolute path to the directory where the snapshots are displayed as mount point directories.

Unmount backup optional parameters

Optional parameters follow the **unmount backup** command and positional parameters.

/CONFIGfile=_configfilename_
> Use the **/CONFIGfile** parameter to specify the name (*configfilename*) of the configuration file that contains the values to use for an **unmount backup** operation.
>
> The *configfilename* variable can include a fully qualified path. If the *configfilename* variable does not include a path, the installation directory is used. If the **/CONFIGfile** parameter is not specified, or if the *configfilename* variable is not specified, the default value is tdpexc.cfg.
>
> If the *configfilename* variable includes spaces, enclose the entire **/CONFIGfile** parameter entry in double quotation marks. For example:
>
> /CONFIGfile="c:\Program Files\tdpexc.cfg"

/LOGFile=_logfilename_
> Use the **/LOGFile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager for Exchange Server. The *logfilename* variable identifies the name of the activity log file.
>
> If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *logfilename* variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager for Exchange Server installation directory.
>
> If the *logfilename* variable includes spaces, enclose the entire **/LOGFile** parameter entry in double quotation marks. For example:
>
> /LOGFile="c:\Program Files\tdpexc.log"
>
> If the **/LOGFile** parameter is not specified, log records are written to the default log file, tdpexc.log.
>
> The **/LOGFile** parameter cannot be turned off, logging always occurs.

/LOGPrune=_numdays_|**No**

> When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, *60* days of log entries are saved. The option No can be entered to disable log pruning.
>
> Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.
>
> Considerations:
> - For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
> - If you specify no, the log file is not pruned.

- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/REMOTECOMPUTER=*computername*

Enter the computer name or IP address of the remote system where the backup was created.

/REMOTECOMPUTERUser=*user*

Enter the user name that is used to log on to the server specified with the **REMOTECOMPUTER** parameter. If a domain is required to log on with the domain account, enter *Domain\User*. To log on to the local account, the domain is not required. There is no default value.

/REMOTECOMPUTERPassword=*passwd*

Enter the password for the user name that is specified with the **REMOTECOMPUTERUser** parameter. There is no default value.

/TSMNODe=*tsmnodename*

Use the *tsmnodename* variable to refer to the Tivoli Storage Manager node name that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

You can store the node name in the Tivoli Storage Manager options file (dsm.opt). This parameter overrides the value in the Tivoli Storage Manager options file if **PASSWORDACCESS** is set to PROMPT. This parameter is not valid when **PASSWORDACCESS** is set to GENERATEin the options file.

/TSMOPTFile=*tsmoptfilename*

Use the *tsmoptfilename* variable to identify the Tivoli Storage Manager options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Tivoli Storage FlashCopy Manager is installed is searched.

If the *tsmoptfilename* variable includes spaces, enclose the entire **/TSMOPTFile** parameter entry in double quotation marks. For example:

```
/TSMOPTFile="c:\Program Files\file.opt"
```

The default is dsm.opt.

/TSMPassword=*tsmpassword*

Use the *tsmpassword* variable to refer to the Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

If you specified **PASSWORDACCESS** GENERATE in the Tivoli Storage FlashCopy Manager options file (dsm.opt), supplying the password is not necessary here because the one that is stored in the registry is used. However, to store the password in the registry, you must specify the Tivoli Storage Manager password the first time that Tivoli Storage FlashCopy Manager connects to the Tivoli Storage Manager server.

If you do specify a password with this parameter when **PASSWORDACCESS** GENERATE is in effect, the command-line value is ignored unless the password for this node is not yet stored in the registry. In that case, the specified password is stored in the registry and used when you run this command.

If **PASSWORDACCESS** PROMPTis in effect, and you do not specify a password value on the command line, then you are prompted for a password.

The Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Unmount backup example

This output example provides a sample of the text, messages, and process status that displays when you use the **unmount backup** command.

For a local backup, enter the following command:

```
tdpexcc unmount backup C:\mount-points-root-dir
```

For a remote backup, enter the following command:

```
tdpexcc unmount backup C:\mount-points-root-dir /remotecomputer=computer-name
 /remotecomputeruser=userID /remotecomputerpassword=user password
```

Command-line overview: Tivoli Storage FlashCopy Manager for SQL Server

The name of the Tivoli Storage FlashCopy Manager for SQL Server command-line interface is tdpsqlc.exe. If you installed the **TDPSQL** package, or you configured the Microsoft SQL Server in Microsoft Management Console (MMC), the program is located (by default) in the Tivoli Storage FlashCopy Manager installation directory (C:\Program Files\Tivoli\tsm\TDPSQL).

Command-line parameter characteristics

The command-line parameters have the following characteristics:
- Positional parameters do not include a leading slash (/) or dash (-).
- Optional parameters can display in any order after the required parameters.
- Optional parameters begin with a forward slash (/) or a dash (-).
- Minimum abbreviations for keywords are indicated in uppercase text.
- Some keyword parameters require a value.
- For those keyword parameters that require a value, the value is separated from the keyword with an equal sign (=).
- If a parameter requires more than one value after the equal sign, the values are separated with commas.
- Each parameter is separated from the others by using spaces.
- If a parameter value includes spaces, the value must be enclosed in double quotation marks.

- A positional parameter can display only once per command invocation.

Where repeatable syntax displays, separate multiple values with commas as indicated in the following example:

TDPSQLC command

```
              ┌─────,─────┐
              │     ▼     │
►►──TDPSQLC──Backup──┬─dbname─┬─────────────────────────────────────►◄
                     └─*──────┘
```

Use the wildcard asterisk (*) following the command to select all instances on the server of database names or file names.

Command-line interface help

Issue the `tdpsqlc ?` or `tdpsqlc help` command to display help for the command-line interface. You can see more specific help for commands by entering a command like the following example: **tdpsqlc help backup**, where **backup** is an example of a command.

Related tasks:

Backup command

Use the **backup** command to back up all or part of one or more SQL databases from the SQL Server to Tivoli Storage FlashCopy Manager.

You can enter the * character to back up all databases. You can specify more than one database for multiple database and transaction log backups.

When you use the **backup** command, remember the following facts:
- You cannot back up or restore the `tempdb` database because this database is created by the SQL Server each time the server is started.
- The user ID that is used by Tivoli Storage FlashCopy Manager to log on to the SQL Server must have the SQL Server SYSADMIN fixed server role.
- You can use the TRANSACT-SQL database consistency checker statement DBCC CHECKDB ('DBNAME') to verify the integrity of the SQL databases before you back them up.

Backup syntax

Use the **backup** command syntax diagrams as a reference to view available options and truncation requirements.

TDPSQLC command

```
                                  ┌─FULL─────┐
►►──TDPSQLC──BACKup──dbname──┬─────────┬──────────────────────────►◄
                            ├─FULL─────┤
                            └─COPYFull─┘
```

Backup optional parameters

```
        (1)    (2)
►►──────┬──────────────────────────────────────────────┬──────────►
        └─/AAGName───=AlwaysOn Availability Group name──┘
```

```
►►─┬────────────────┬──┬──────────────────┬─────────────────────────►
   └─/ALWAYSONPriority─┘  └─/BACKUPDESTination=─┬─LOCAL─┬──┘
                                               ├─TSM───┤
                                               └─BOTH──┘


►──┬──────────────────────────┬──┬────────────────────────────┬──────►
   └─/BACKUPMETHod=─┬─LEGACY─┬─┘  └─/CONFIGfile─┬─=tdpsql.cfg──────┬─┘
                    └─VSS────┘                 └─=configfilename──┘


►──┬──────────────────────────────────────┬──┬─────────────────────────┬──►
   └─/ENABLEREPlacementchars─┬─=No──┬──────┘  └─/EXCLUDEdb──┬──,──┬──────┘
                             └─=Yes─┘                       └─=db-name,...─┘


►──┬───────────────────────┬──┬──────────────────────┬───────────────────►
   └─/EXCLUDEALwaysondbs──┘   └─/EXCLUDESTandarddbs──┘


►──┬──────────────────────────────────────────┬──────────────────────────►
   └─/FCMOPTFile─┬─=dsm.opt────────┬───────────┘
                 └─=dsmoptfilename─┘


►──┬──────────────────────────────────────────────────┬──────────────────►
   └─/LOGFile─┬─=tdpsql.log [or cfg value]─┬───────────┘
             └─=logfilename────────────────┘


►──┬─────────────────────────────────────────┬──┬──────────┬──┬────────┬──►
   └─/LOGPrune─┬─=60 [or cfg value]─┬─────────┘  └─/OFFLOAD─┘  └─/Quiet─┘
              ├─=numdays───────────┤
              └─=No────────────────┘


►──┬──────────────────────────────────────────────────────┬──────────────►
   └─/SQLAUTHentication─┬─=INTegrated [or cfg value]─┬──────┘
                        └─=SQLuserid────────────────┘


►──┬───────────────────────┬──┬───────────────────────────┬──────────────►
   └─/SQLCHECKSum=─┬─No──┬──┘  └─/SQLPassword─┬─=" "────────────┬─┘
                  └─Yes─┘                     └─=sqlpasswordname─┘
```

```
                 ┌─=[local computer name or cfg value]─┐
├─┬───────────────────────────────────────────────────────┬────────────────────►
  │  /SQLSERVer─┴─=sqlprotocol:sqlservername──────────────┘
  └────────────────────────────────────────────────────────

        ┌─=sa─────────┐
├─┬──────────────────────────┬──────┬──────────────────┬─►◄
  │  /SQLUSer─┴─=sqlusername─┘       └─/USEALWAYSONnode─┘
  └──────────────────────────
```

Notes:

1   For the optional parameters, the **/BACKUPMETHod=** is only valid when using the **full** or **copyfull** positional parameters. The **full** and **copyfull** backups can be performed using VSS or legacy operations. The **/BACKUPMETHod=** parameter is used to choose between the options. The **log**, **diff**, **file**, and **group** backups can be performed only when using legacy operations. The **/BACKUPMETHod=** parameter is not supported in with these types of backups because only legacy backups are viable.

2   The **/BACKUPDESTination** parameter is valid only when using the **full** or **copyfull** positional parameters. The **full** and **copyfull** backups can be saved to local storage, TSM server storage, or both. The **/BACKUPDESTination** parameter is used to choose among the options.

Backup positional parameters

Positional parameters immediately follow the **backup** command and precede the optional parameters.

The following positional parameters specify the object to back up:

* | *dbname*

    *   Back up all databases. Use caution when you specify the wildcard character (∗) as Microsoft warns not to back up more than a few dozen databases in a single command because of SQL Server limitations.

    dbname
    Back up the specified database. Multiple entries are separated by commas. If separated by commas, ensure that there is no space between the comma and the database name. If any database contains commas or blanks, enclose the database name in double quotation marks.

The following positional parameter specifies the type of backup to run:

FULL   A **full** VSS database backup contains all of the contents of a SQL Server database, such as database files, log files, full-text index files, and FILESTREAM files (SQL Server 2008 or later versions).

COPYFull
    A copy-only full backup contains a copy-only version of a full backup. These backups are considered out of the regular sequence of conventional SQL Server backups. The backups do not affect the transaction logs or any sequence of backups, such as differential backups or full backups. Use this

option to create copy-only full backups periodically for long-term retention without affecting existing backup schedules or retention policies for disaster recovery.

Backup optional parameters

Optional parameters follow the **backup** command and positional parameters.

/AAGName=_AlwaysOn Availability Group name_

When you back up a database list or all databases with the wildcard character, *, and specify the **/AAGName** parameter, only databases from the availability group that you specify are backed up.

/ALWAYSONPriority

Use this parameter to specify that a local availability database is backed up only if it has the highest backup priority among the availability replicas that are working properly on SQL Server 2012 and later versions. You can use this parameter at the command-line interface or as part of a scheduled backup.

/BACKUPDESTination= LOCAL|TSM|BOTH

Use the **/BACKUPDESTination** parameter to specify the location where the backup is stored.

You can specify:

TSM The backup is stored on Tivoli Storage Manager server storage only. This option is the default.

LOCAL

The backup is stored on local shadow volumes only. This option is only valid when the **/BACKUPMETHod** parameter specifies VSS.

BOTH The backup is stored on Tivoli Storage Manager server storage and local shadow volumes. This option is valid only when the **/BACKUPMETHod** parameter specifies VSS.

The **/BACKUPDESTination** parameter is valid only when the **full** or **copyfull** positional parameters are used. The **full** and **copyfull** backups can be saved to Tivoli Storage Manager server storage, local storage, or both. The **/BACKUPDESTination** parameter is used to choose among options. The **log**, **diff**, **file**, and **group** backups can be stored only to Tivoli Storage Manager server storage. In this scenario, the **/BACKUPDESTination** parameter is not supported because Tivoli Storage Manager is the only viable option.

/BACKUPMETHod=LEGACY|VSS

Use the **/BACKUPMETHod** parameter to specify the manner in which the backup is completed.

You can specify:

LEGACY

The backup is completed with the legacy API. This backup is the SQL streaming backup and restore API as used in previous versions of Tivoli Storage FlashCopy Manager for SQL. This option is the default value.

VSS The backup is completed with VSS.

The **/BACKUPMETHod** parameter is valid only when the **full** or **copyfull** positional parameters are used. The **full** and **copyfull** backups can be completed by using VSS or legacy operations. The **/BACKUPMETHod**

parameter is used to choose between the options. The **log**, **diff**, **file**, and **group** backups can completed only by using legacy operations. In this scenario, the **/BACKUPMETHod** parameter is not supported because legacy is the only viable option.

/CONFIGfile=*configfilename*

The **/CONFIGfile** parameter specifies the name of the Tivoli Storage FlashCopy Manager configuration file. The configuration file contains the values for the Tivoli Storage FlashCopy Manager configurable options. When you use this parameter, review the following information:

- *configfilename* can include a fully qualified path. If *configfilename* does not include a path, it uses the directory where Tivoli Storage FlashCopy Manager is installed.
- If *configfilename* includes spaces, place the space character in double quotation marks.
- If you do not specify **/CONFIGfile**, the default value is tdpsql.cfg.

/ENABLEREPlacementchars=No|Yes

The **/ENABLEREPlacementchars** parameter enables SQL Server databases that have backslash (\) or colon (:) characters in the database name to be backed up. The maximum length of the database name is 128 characters. This parameter applies only to version 7.1.1 and later versions.

You can specify the following values:

Yes   Enable to process backslash (\) or colon (:) characters in a database name, and back up the database to Tivoli Storage Manager. This value is the default.

No   Prevent database backups to Tivoli Storage Manager if a user-defined string is substituted for a backslash (\) or colon (:) character in the database name.

/EXCLUDEdb=*dblist*

The **/EXCLUDEdb** parameter specifies the name of the databases to exclude from the backup operation.

/EXCLUDEALwaysondbs

Use this parameter to exclude all AlwaysOn Availability Databases from the backup operation. If you want to exclude specific databases, use the **/EXCLUDEdb** parameter.

/EXCLUDESTandarddbs

Use this parameter to exclude all standard databases from the backup operation. If you want to exclude specific databases, use the **/EXCLUDEdb** parameter.

/FCMOPTFile=*dsmoptfilename*

The **/FCMOPTFile** parameter specifies the Tivoli Storage FlashCopy Manager options file to use.

Considerations:

- The *dsmoptfilename* variable can include a fully qualified path. If you do not include a path, the Tivoli Storage FlashCopy Manager installation directory is used.
- If the *dsmoptfilename* variable spaces, enclose it in double quotation marks.
- If you do not specify **/FCMOPTFile**, the default value is *dsm.opt*.

- If you specify **/FCMOPTFile** but not *dsmoptfilename*, the default is also *dsm.opt*.

/LOGFile=*logfilename*

The **/LOGFile** parameter specifies the name of the activity log that is generated by Tivoli Storage FlashCopy Manager. This activity log records significant events such as completed commands and error messages. The Tivoli Storage FlashCopy Manager activity log is distinct from the SQL Server error log. The *logfilename* variable identifies the name to be used for the activity log generated by Tivoli Storage FlashCopy Manager.

Considerations:

- If the specified file does not exist, it is created. If it does exist, new log entries are appended to the file.
- The file name can include a fully qualified path; however, if you specify no path, the file is written to the directory where Tivoli Storage FlashCopy Manager is installed.
- You cannot turn off Tivoli Storage FlashCopy Manager logging activity. If you do not specify **/LOGFile**, log records are written to the default log file. The default log file is tdpsql.log.
- When you use multiple simultaneous instances of Tivoli Storage FlashCopy Manager to run operations, use the **/LOGFile** parameter to specify a different log file for each instance used. This function directs logging for each instance to a different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.

/LOGPrune=*numdays***|No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, *60* days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:

- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.

– Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/OFFLOAD

Specify this option if, after the VSS snapshot is complete, you want to offload the transfer of the data from the Tivoli Storage Manager server to the system specified by the **REMOTEDSMAGENTNODE** parameter. This option is only valid when the **BACKUPDESTination** parameter is set to either TSM or BOTH. The default is to not offload data.

/Quiet This parameter prevents status information from being displayed. This function does not affect the level of information that is written to the activity log.

/SQLAUTHentication=INTegrated | SQLuserid

This parameter specifies the authorization mode that is used when you log on to the SQL Server. The integrated value specifies Windows authentication. The user ID you use to log on to Windows is the same ID you use to log on to the SQL Server. This option is the default value.

Use the sqluserid value to specify SQL Server user ID authorization. The user ID specified by the **/sqluserid** parameter is the ID you use to log on to the SQL Server. Any SQL user ID must have the SQL Server SYSADMIN fixed server role.

/SQLCHECKSum=No|Yes

The **/SQLCHECKSum** parameter is used to verify the integrity of a legacy database backup. Integrity checking is a process that validates the values in a file or configuration for unexpected changes. Values are verified between the current state and the baseline state.

You can specify the following values:

No   Do not enable integrity checking for a legacy database backup. This value is the default.

Yes   Enable integrity checking for a legacy database backup.

In the Performance Properties window of Microsoft Management Console, you can enable or disable the checksum option for all your legacy databases at once. You can override the global setting, and temporarily enable or disable the checksum option for a database backup, by setting this **SQLCHECKSum** parameter value to **Yes** or **No**.

/SQLPassword=_sqlpasswordname_

This parameter specifies the SQL password that Tivoli Storage FlashCopy Manager uses to log on to the SQL Server that objects are backed up from or restored to.

Considerations:
- Using this parameter means that you are using SQL Server authentication. The SQL Server and the SQL user ID for this password must both be configured for SQL Server authentication.
- If you do not specify **/SQLPassword**, the default value is blank (" ").
- If you specify **/SQLPassword**, but not _sqlpasswordname_, the default is also blank (" ").
- This parameter is ignored if you use the **/SQLAUTH=INTegrated** parameter with it.

/SQLSERVer=_sqlprotocol:sqlservername_

The **/SQLSERVer** parameter specifies the SQL Server that Tivoli Storage

FlashCopy Manager logs on to. The *sqlprotocol* variable specifies the communication protocol to use. You can specify one of the following protocols:

- `lpc`: Use Shared Memory protocol.
- `np`: Use Named Pipes protocol.
- `tcp`: Use Transmission Control protocol.
- `via`: Use Virtual Interface Architecture protocol.

If no protocol is specified, Tivoli Storage FlashCopy Manager logs on to the SQL Server according to the first protocol that becomes available.

Considerations:

- The default value is the value that is specified by the SQL Server configurable option in the Tivoli Storage FlashCopy Manager configuration file. This option is initially the local computer name.
- If you specify **/SQLSERVer** but not *sqlservername*, the local computer name is used.
- The following two shortcuts are accepted as the local computer name: `.` (`local`) These shortcuts are a period and the word *local* within parentheses.
- You must specify the name if the SQL Server is not the default instance or is a member of a failover cluster.
- The format of *sqlservername* depends on what type of instance it is and whether it is clustered or not:

Format	Instance?	Clustered?	Name required?
local-computername	default	no	no
local-computername\ instancename	named	no	yes
virtualservername	default	yes	yes
virtualservername\ instancename	named	yes	yes

> *localcomputername*
> > The network computer name of the computer the SQL Server and Tivoli Storage FlashCopy Manager are on. The TCP/IP host name might not always be the same.
>
> *instancename*
> > The name that is given to the named instance of SQL Server that is specified during installation of the instance.
>
> *virtualservername*
> > The name that is given to the clustered SQL Server specified during clustering service setup. This name is not the cluster or node name.

/SQLUSer=*sqlusername*
> The **/SQLUSer** parameter specifies the name that Tivoli Storage FlashCopy Manager uses to log on to the SQL Server.
>
> Considerations:
>
> - Using this parameter means that you are using SQL Server authentication. The SQL Server and the SQL user ID for this password must both be configured for SQL Server authentication.

- The SQL user ID must have the SQL Server SYSADMIN fixed server role.
- If you do not specify **/SQLUSer**, the default is *sa*.
- If you specify **/SQLUSer** but not *sqlusername*, the default is also *sa*.
- This parameter is ignored if you use the **/SQLAUTH=integrated** parameter with it.

/USEALWAYSONnode

Specify this parameter to back up standard databases on SQL Server 2012 and later versions by using the AlwaysOn node. By setting this parameter, you can back up all availability databases and standard databases under a single node to help you to manage your database backups more easily. By default, SQL Server 2012 and later version availability databases are backed up to the AlwaysOn node.

Backup examples

The following examples are provided to show how the **backup** command can be entered with various parameters and options.

If you want to use the **backup** command from the command-line interface, the following examples are provided to help model the command syntax:

- To complete a full backup of a database, enter the following command:
  ```
  tdpsqlc backup
  ```
- To complete a full backup of all standard databases, enter the following command:
  ```
  tdpsqlc backup * full /EXCLUDEALwaysondbs
  ```
- To complete a log backup of all availability databases, enter the following command:
  ```
  tdpsqlc backup * log /EXCLUDESTandarddbs
  ```
- For a more complex example, consider the following scenario: There are three AlwaysOn Availability Groups. The first availability group is called *AG01* with the following databases:
  - AlwaysOn Availability Database called *AlwaysOnLegacyDB1*
  - AlwaysOn Availability Database called *AlwaysOnLegacyDB3*

  The second availability group is called *AG03* with the following AlwaysOn Availability Database: *AlwaysOnLegacyDB2*. The third availability group is called *AG04* with the following databases:
  - AlwaysOn Availability Database called *AlwaysOnLegacyDB5*
  - AlwaysOn Availability Database called *AlwaysOnLegacyDB6*
  - Standard database that is called *SQL_DB1*
  - Standard database that is called *SQL_DB2*

  To complete a full backup with a database list that matches both standard and availability databases, but excluding standard databases, enter the following command:
  ```
  C:\Program Files\tivoli\tsm\TDPSql>tdpsqlc backup AlwaysOnLegacy*,SQL*
   full /backupdest=TSM /backupmeth=legacy /EXCLUDESTandarddbs
  ```
- When you use the **/AAGName** parameter to filter the databases that are backed up, refer to the following scenario with the examples: There are two AlwaysOn Availability Groups. The first availability group is called *AG01* with the following databases:
  - AlwaysOn Availability Database called *AlwaysOnLegacyDB1*

– AlwaysOn Availability Database called *AlwaysOnLegacyDB3*

The second availability group is called *AG04* with the following databases:

– AlwaysOn Availability Database called *AlwaysOnLegacyDB5*

– AlwaysOn Availability Database called *AlwaysOnLegacyDB6*

When you enter a **backup** command for all databases, but use the **/AAGName** parameter to include only databases from *AG01* in the backup, enter the following command:

```
C:\Program Files\tivoli\tsm\TDPSql>tdpsqlc backup * full /backupdest=TSM
 /backupmeth=legacy /AAGName=AG01
```

When you enter a **backup** command for a database list with wildcards, but use the**/AAGName** parameter to include only databases from *AG04* in the backup, enter the following command:

```
C:\Program Files\tivoli\tsm\TDPSql>tdpsqlc backup AlwaysOn*,SQL* full
 /backupdest=TSM /backupmeth=legacy /AAGName=AG04
```

When you enter a **backup** command for a database list with wildcards, but do not match all databases from the specified AlwaysOn Availability Group, enter the following command:

```
C:\Program Files\tivoli\tsm\TDPSql>tdpsqlc back *DB5 full /backupdest=TSM
 /backupmeth=legacy /AAGName=AG04
```

- To complete a differential backup with a database list that matches both standard and availability databases, but excluding availability databases, enter the following command:

```
C:\Program Files\tivoli\tsm\TDPSql>tdpsqlc backup AlwaysOnLegacy*,SQL*
 diff /EXCLUDEALwaysondbs
```

Delete backup command

Use the **delete backup** command to delete a VSS backup of a SQL Server database.

You must have local registry rights (for all versions of SQL Server) to run a Tivoli Storage FlashCopy Manager for SQL Server delete backup.

If you delete multiple LOCAL snapshots that are stored on SAN Volume Controller or Storwize family Space Efficient volumes (SEV), you must do so in the same order in which you created the snapshots. That is, you must delete the oldest one first, followed by the second oldest. Failure to delete them in this order can cause removal of other snapshots of the same source.

Delete Backup syntax

Use the **delete backup** command syntax diagrams as a reference to view available options and truncation requirements.

TDPSQLC command

```
►►──TDPSQLC──DELete BACKup──┬──dbname──┬──FULL─────────────────────►
                            │    ,     │
                            └────*─────┘
```

```
                                              tdpsql.cfg
 ──────────────────────────────────────────────────────────────────────►
    └─/CONFIGfile=─┬────────────────┬─┘
                   └─configfilename─┘
```

```
                         ─=sqlserver value [or cfg value]─
 ─────────────────────────────────────────────────────────────────────►
    └─/FROMSQLSERVer=─┬──────────────────────────────────┬─┘
                      └─=sqlservername──────────────────┘
```

```
                 ─60──      ─/OBJect=──objectname,...─   ─/Quiet─
 ──────────────────────────────────────────────────────────────────►◄
    └─/LOGPrune=─┬─numdays─┬─┘  └──────────────────────┘  └────────┘
                 └─No─────┘
```

Delete Backup positional parameters

Positional parameters immediately follow the **delete backup** command and
precede the optional parameters.

The following positional parameters specify the backup to delete:

* | *dbname*

> *****   Delete the active backups of all databases.

> *dbname*
>> Delete a backup of the specified database. The active backup is
>> deleted unless you specify a different backup with the **/object**
>> optional parameter.
>>
>> Multiple entries are separated by commas. If separated by commas,
>> make sure that there is no space between the comma and the
>> database name. If any database name contains commas or blanks,
>> enclose the database name in double quotation marks.

The following positional parameter specifies the type of delete backup to run:

FULL   Delete full type backups.

COPY   Delete copy type backups.

Delete Backup optional parameters

Optional parameters follow the **delete backup** command and positional
parameters.

/CONFIGfile=*configfilename*
> Use the **/configfile** parameter to specify the name (*configfilename*) of the
> Tivoli Storage FlashCopy Manager for SQL Server configuration file that
> contains the values to use for a **delete backup** operation.
>
> The *configfilename* variable can include a fully qualified path. If the
> *configfilename* variable does not include a path, the Tivoli Storage
> FlashCopy Manager for SQL Server installation directory is used. If the
> **/configfile** parameter is not specified, or if the *configfilename* variable is
> not specified, the default value is tdpsql.cfg.

If the *configfilename* variable includes spaces, enclose the entire **/configfile**
parameter entry in double quotation marks. For example:

```
/CONFIGfile="c:\Program Files\file.cfg"
```

See "Set positional parameters" on page 296 for descriptions of available
configuration parameters.

/FROMSQLSERVer=*server-name*

Use the **/fromsqlserver** parameter to specify the name of the SQL Server
where the original backup was done. This parameter is necessary only
when the name of the SQL Server to delete from, as determined by the
/sqlserver parameter, is different from the name of the SQL Server that
the backup objects were created from. The default value is the **/sqlserver**
value or the value that is set in the Tivoli Storage FlashCopy Manager
configuration file.

Considerations:

- If the two SQL Server names are different, you must use this parameter
  even if **/fromsqlserver** was a non-clustered default instance.

/LOGFile=*logfilename*

Use the **/logfile** parameter to specify the name of the activity log file that
is generated by Tivoli Storage FlashCopy Manager for SQL Server.

The *logfilename* variable identifies the name of the activity log file.

If the specified log file does not exist, a new log file is created. If the
specified log file exists, new log entries are appended to the file. The
logfilename variable can include a fully qualified path. However, if no path
is specified, the log file is written to the Tivoli Storage FlashCopy Manager
for SQL Server installation directory.

If the *logfilename* variable includes spaces, enclose the entire **/logfile**
parameter entry in double quotation marks. For example:

```
/LOGFile="c:\Program Files\mytdpsql.log"
```

If the **/logfile** parameter is not specified, log records are written to the
default log file, tdpsql.log.

The **/logfile** parameter cannot be turned off, logging always occurs.

When you use multiple simultaneous instances of Tivoli Storage FlashCopy
Manager for SQL Serverto run operations, use the **/logfile** parameter to
specify a different log file for each instance used. This function directs
logging for each instance to a different log file and prevents interspersed
log file records. Failure to specify a different log file for each instance can
result in unreadable log files.

/LOGPrune=*numdays*|**No**

When you prune log data, you can discard some of the generated logs
according to detailed filtering criteria that you set. Depending on the
option that you set for the **/LOGPrune** parameter, a certain number of days
of data are saved. By default, *60* days of log entries are saved. The option
No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly
request log pruning at any time.

Considerations:

- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in
  the activity log file except for the current command entries.

- If you specify *no*, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/OBJect=*objectname,...*
Use the **/object** parameter to specify the names of backup objects you want to delete. The object name uniquely identifies each backup object and is created by Tivoli Storage FlashCopy Manager for SQL Server.

Use the Tivoli Storage FlashCopy Manager for SQL Server query fcm * /all command to view the names of all available backup objects. This parameter specifies that only particular backup objects for the specified SQL databases and backup object type is to be deleted. The *objectname* variable specifies the names of the backup objects you want to delete. The object name uniquely identifies each backup object and is created by Tivoli Storage FlashCopy Manager for SQL Server.

/QUERYNode=DP | ALWAYSON
Specify whether you want to query standard databases from SQL Server 2012 that were backed up from a standard Data Protection for SQL node or the AlwaysOn node. This parameter is ignored for availability databases because the availability databases are always backed up under the AlwaysOn node.

/Quiet This parameter prevents status information from being displayed. This function does not affect the level of information that is written to the activity log.

Delete backup example
This output example provides a sample of the text, messages, and process status that displays when you use the **delete backup** command.

In this example, the tdpsqlc delete backup xivdb1 full command deletes a full backup of database *xivdb1*. The following output is displayed:

```
Connecting to SQL Server, please wait...

Querying for Backups ....

Backup(s) to be deleted:
  xivdb1 : VSS : full : 02/10/2014 10:03:29
VSS Delete backup operation completed with rc = 0
    Files Examined    : 1
    Files Completed   : 1
    Files Failed      : 0
    Total Bytes       : 0
```

Help command

Use the **tdpsqlc help** command to display help for Tivoli Storage FlashCopy
Manager for SQL Server commands.

This command lists one or more commands and their parameters. When you use a
language that is not English, you might be required to set the width of your screen
display to a value greater than 80 characters. The wider setting displays the entire
help description in one screen. For example, set the screen width to 100 characters.

Help syntax

Use the **help** command syntax diagrams as a reference to view available options
and truncation requirements.

TDPSQLC command

```
►►──TDPSQLC─┬──────┬─┬─────────────┬─┬────────────────┬──────────►◄
            ├─?────┤ │      *      │ │       *        │
            └─HELP─┘ └──command────┘ └──subcommand────┘
```
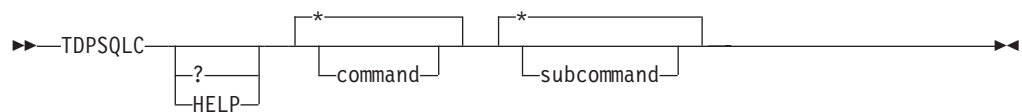
Help positional parameters

Positional parameters immediately follow the **help** command. There are no
optional parameters with this command.

Use the help command to display the syntax of all or selected Tivoli Storage
FlashCopy Manager commands by using a textual notation.

Help uses the following notation:

[*a*]   *a* is optional; *a* might occur zero or one time

{*a* | *b*} Select either *a* or *b*, but not both

{*a* } +   *a* must occur at least one time

{*a* } *   *a* might occur zero or more times

(*a*)   Comments that are not part of the command

UPPERCASE
         Minimum abbreviation (which you can also enter in lowercase)

Mount Backup command

Use the **mount backup** command to mount backups that are managed by Tivoli Storage FlashCopy Manager for SQL Server.

Mount Backup syntax

Use the **mount backup** command syntax diagrams as a reference to view available options and truncation requirements.

TDPSQLC command

```
►►─TDPSQLC─MOUNT BACKup──┬─comp name[(object-id)]=mount point root dir─┬──►
                         └─[,comp name=mount point root dir]───────────┘
```

```
►──┬──────────────────────────────────────────────┬──────────────────────►
   │                  ┌─tdpsql.cfg─────┐           │
   └─/CONFIGfile=─────┼────────────────┼───────────┘
                      └─configfilename─┘
```

```
►──┬──────────────────────────────┬──┬─────────────────────────────┬──────►
   │              ┌─current server─┐  │           ┌─tdpsql.log──┐   │
   └─/FROMSQLSERVer=┼──────────────┼──┘  └─/LOGFile=┼─────────────┼─┘
                  └─servername─────┘                └─logfilename─┘
```

```
►──/LOGPrune=──┬─60───────┬──┬──────────────────────┬────────────────────►
               ├─numdays──┤  │         ┌─latest─┐   │
               └─No───────┘  └─/PITDate=┼────────┼──┘
                                        └─date───┘
```

```
►──┬────────────────────┬──┬───────────────────────┬─────────────────────►
   │         ┌─latest─┐  │  │           ┌─=DP──────┐│
   └─/PITTime=┼────────┼─┘  └─/QUERYNode─┼─=ALWAYSON┼┘
             └─time───┘                 └─=BOTH────┘
```

```
►──┬──────────────────────────────────┬──┬──────────────────────────┬─────►
   └─/REMOTECOMPUTER=──computername────┘  └─/REMOTECOMPUTERUser=──user┘
```

```
►──┬───────────────────────────────────┬──┬──────────────────────────┬────►
   └─/REMOTECOMPUTERPassword=──passwd───┘  └─/TSMNODe=──tsmnodename────┘
```

```
►──┬─────────────────────────────┬──┬───────────────────────────┬──►◄
   │          ┌─dsm.opt──────────┐│  └─/TSMPassword=──tsmpassword┘
   └─/TSMOPTFile=┼────────────────┼┘
               └─tsmoptfilename──┘
```

Mount backup positional parameter

The positional parameters immediately follow the **mount backup** command and precede the optional parameters.

The following positional parameters specify the objects to mount:

*component name***[(***object-id***)]=***mount point root dir***[,***component name=mount point root dir***]**
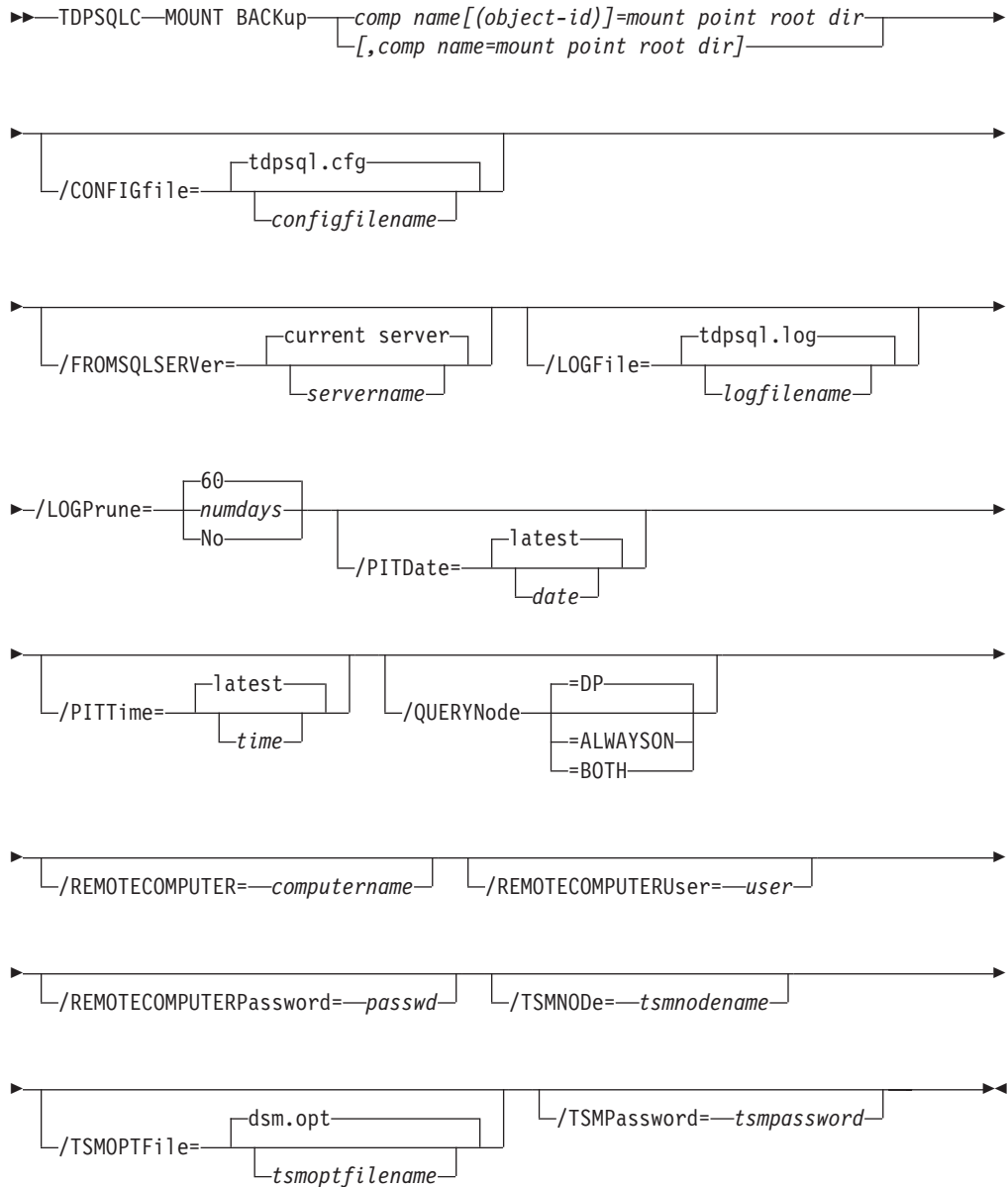
> *component name***[(***object-id***)]**
> > Specify the backup of a local SQL Server database or storage group.
>
> *mount point root dir*
> > Specify the absolute path to the directory where the snapshots are going to be displayed as mount point directories. The directory must be empty. If not empty, an error is reported.

The list must contain all non-qualified objects or all qualified objects. The list cannot contain a combination of non-qualified objects and qualified objects. Specify the list by using the following syntax:

```
mount backup object-1[(object-1-id)]= mount-point-1[,object-2[(object-2-id)]
=mount-point-2...]
```

Mount Backup optional parameters

Optional parameters follow the **mount backup** command and positional parameters.

/CONFIGfile=*configfilename*
> Use the **/configfile** parameter to specify the name (*configfilename*) of the Tivoli Storage FlashCopy Manager for SQL Server configuration file that contains the values to use for a **mount backup** operation.
>
> The *configfilename* variable can include a fully qualified path. If the *configfilename* variable does not include a path, the Tivoli Storage FlashCopy Manager for SQL Server installation directory is used. If the **/configfile** parameter is not specified, or if the *configfilename* variable is not specified, the default value is tdpsql.cfg.
>
> If the *configfilename* variable includes spaces, enclose the entire **/configfile** parameter entry in double quotation marks. For example:
>
> /CONFIGfile="c:\Program Files\tdpsql.cfg"

/FROMSQLSERVer=*server-name*
> Use the **/fromsqlserver** parameter to specify the name of the server where the original backup was done. The default is the local server.

/LOGFile=*logfilename*
> Use the **/logfile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager. The *logfilename* variable identifies the name of the activity log file.
>
> If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *logfilename* variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager for SQL Server installation directory.
>
> If the *logfilename* variable includes spaces, enclose the entire **/logfile** parameter entry in double quotation marks. For example:
>
> /LOGFile="c:\Program Files\tdpsql.log"

If the **/logfile** parameter is not specified, log records are written to the default log file, tdpsql.log.

The **/logfile** parameter cannot be turned off, logging always occurs.

/LOGPrune=_numdays_ | **No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, _60_ days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:
- For _numdays_, the range is _0_ to _9999_. A value of _0_ deletes all entries in the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is _60_.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying _numdays_ or _no_; in this case, the default value, _60_, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/PITDAte=_date_

Use the **/pitdate** parameter with the **/pittime** parameter to establish a point in time for which you want to mount the latest version of your backups. Backups that were backed up on or before the date and time you specified, and that were not deleted before the date and time you specified, are processed. Backup versions that you create after this date and time are ignored. Specify the appropriate date in the _date_ variable; use the same format that you selected with the DATEFORMAT option in the Tivoli Storage FlashCopy Manager for SQL Server options file.

If the _date_ or the _time_ is not specified, then no date and time are established. By default the backup is mounted from the most recent available backup.

If either _date_ or _time_ is specified, then the backup is mounted from the earliest backup that is selected after the established mount date and time. If no backup after the established date and time is found, by default the backup is mounted from the most recent available backup.

Notes:
- If you specify both _date_ and _time_, this selection establishes the mount backup period.

- If you specify *date* and you do not specify *time*, *time* defaults to a value of 23:59:59. This selection establishes the *date* at the specified date.
- If you specify *time* without *date*, then *date* defaults to the current date. This selection establishes the mount date and time as the current date at the specified *time*.

/PITTime=*time*

Use the **/pittime** parameter with the **/pitdate** option to establish a point in time for which you want to mount the latest version of your backups. Files or images that were backed up on or before the date and time you specify, and that were not deleted before the date and time you specify, are processed. Backup versions that you create after this date and time are ignored. This option is ignored if you do not specify the **/pitdate** parameter. Specify the appropriate time in the *time* variable; use the same format that you selected with the TIMEFORMAT option in the Tivoli Storage FlashCopy Manager for SQL Server options file.

If the *date* or the *time* is not specified, then no date and time are established. By default the backup is mounted from the most recent available backup.

If either *date* or *time* is specified, then the backup is mounted from the earliest backup that is selected after the established mount date and time. If no backup after the established date and time is found, by default the backup is mounted from the most recent available backup.

Notes:
- If you specify both *date* and *time*, this selection establishes the mount backup period.
- If you specify *date* and you do not specify *time*, *time* defaults to a value of 23:59:59. This selection establishes the *date* at the specified date.
- If you specify *time* without *date*, then *date* defaults to the current date. This selection establishes the mount date and time as the current date at the specified *time*.

/QUERYNode=DP | ALWAYSON | BOTH

Specify whether you want to query standard databases from SQL Server 2012 that were backed up from a standard Data Protection for SQL Server node, the AlwaysOn node, or both nodes. To mount a backup that is using the AlwaysOn node (for AlwaysOn Availability databases), specify /QUERYNode = ALWAYSON.

/REMOTECOMPUTER=*computername*

Enter the IP address or host name for the remote system where you want to mount the data.

/REMOTECOMPUTERUser=*user*

Enter the user name that is used to log on to the server specified with the **REMOTECOMPUTER** parameter. If a domain is required to log on with the domain account, enter *Domain\User*. To log on to the local account, the domain is not required. There is no default value.

/REMOTECOMPUTERPassword=*passwd*

Enter the password for the user name that is specified with the **REMOTECOMPUTERUser** parameter. There is no default value.

/TSMNODe=_tsmnodename_

Use the _tsmnodename_ variable to refer to the Tivoli Storage Manager node name that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

You can store the node name in the Tivoli Storage Manager options file (`dsm.opt`). This parameter overrides the value in the Tivoli Storage Manager options file if PASSWORDACCESS is set to PROMPT. This parameter is not valid when PASSWORDACCESS is set to GENERATE in the options file.

/TSMOPTFile=_tsmoptfilename_

Use the _tsmoptfilename_ variable to identify the Tivoli Storage Manager options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Tivoli Storage FlashCopy Manager is installed is searched.

If the _tsmoptfilename_ variable includes spaces, enclose the entire **/tsmoptfile** parameter entry in double quotation marks. For example:

`/TSMOPTFile="c:\Program Files\dsm.opt"`

The default is `dsm.opt`.

/TSMPassword=_tsmpassword_

Use the _tsmpassword_ variable to refer to the Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

If you specified PASSWORDACCESS GENERATE in the Tivoli Storage FlashCopy Manager options file (`dsm.opt`), supplying the password is not necessary here because the one that is stored in the registry is used. However, to store the password in the registry, you must specify the Tivoli Storage Manager password the first time that Tivoli Storage FlashCopy Manager connects to the Tivoli Storage Manager server.

If you do specify a password with this parameter when PASSWORDACCESS GENERATE is in effect, the command-line value is ignored unless the password for this node is not yet stored in the registry. In that case, the specified password is stored in the registry and used when you run this command.

If PASSWORDACCESS PROMPT is in effect, and you do not specify a password value on the command line, then you are prompted for a password.

The Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Mount backup examples

These output examples provide a sample of the text, messages, and process status that displays when you use the **mount backup** command.

Examples:

```
TDPSQLC MOUNT BACKup SQL-DB-1=K:\MP-dir
```

```
TDPSQLC MOUNT BACKup SQL-DB-1(20120523070512)=L:\MP-dir
```

Policy commands for Tivoli Storage FlashCopy Manager for SQL

Create Policy

This command is used to create a policy.

TDPSQLC command: CREATE POLicy
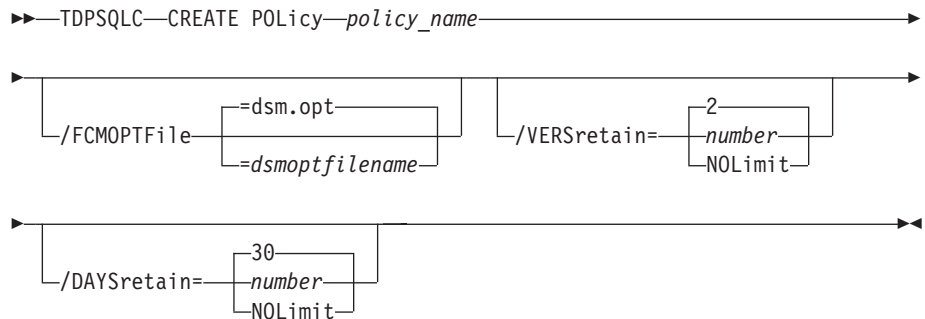
```
►►──TDPSQLC──CREATE POLicy──policy_name──────────────────────────────────►

 ┌─────────────────────┐          ┌──2──────┐
►─┴─/FCMOPTFile─┬─=dsm.opt──────┬─┴──/VERSretain=─┼─number──┼──────────────►
                └─=dsmoptfilename─┘               └─NOLimit─┘

 ┌──30──────┐
►─┴─/DAYSretain=─┼─number──┼──────────────────────────────────────────►◄
                 └─NOLimit─┘
```

Parameters:

- *policy_name* (required): Specifies the name of the policy that is being created. To create a policy, the policy name must be unique.
- **VERSretain**: Specifies the number of snapshot versions to retain (1 - 9999). You can also specify **NOLimit** to represent an unlimited number of snapshot versions to retain.
- **DAYSretain**: Specifies the number of days to retain a snapshot (0 - 9999). You can also specify **NOLimit** to represent an unlimited number of days to retain snapshot versions.

Update Policy

This command is used to update or modify the retention parameters of an existing policy.

TDPSQLC command: UPDATE POLicy
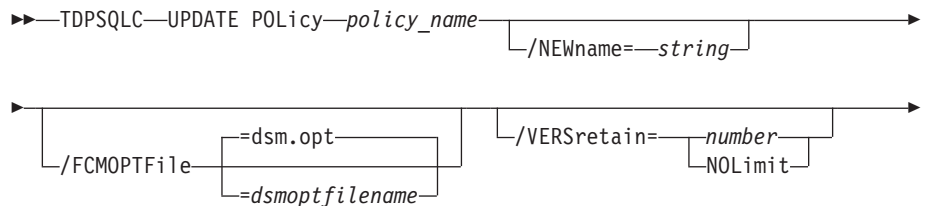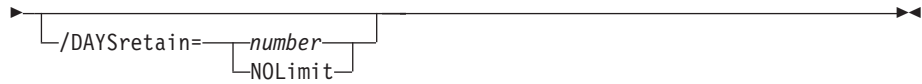
```
►►──TDPSQLC──UPDATE POLicy──policy_name────────────────────────────────►
                                    └─/NEWname=──string─┘

 ┌─────────────────────┐
►─┴─/FCMOPTFile─┬─=dsm.opt──────┬─┴──/VERSretain=─┬─number──┬──────────────►
                └─=dsmoptfilename─┘               └─NOLimit─┘
```

```
                                                                    ◄►
      └/DAYSretain=─┬─number─┬─
                    └NOLimit─┘
```

Parameters:
- **NEWname**: Specifies the new name of the policy, if the name is being updated. The policy name must be unique.
- *policy_name* (required): Specifies the name of the policy that is being updated.
- **VERSretain**: Specifies the number of snapshot versions to retain (1 - 9999). You can also specify **NOLimit** to represent an unlimited number of snapshot versions to retain.
- **DAYSretain**: Specifies the number of days to retain a snapshot (0 - 9999). You can also specify **NOLimit** to represent an unlimited number of days to retain snapshot versions.

Copy Policy
> This command is used to copy an existing policy to a new policy.

TDPSQLC command: COPY POLicy

```
►►─TDPSQLC─COPY POLicy─existing_policy_name─new_policy_name──────►
```
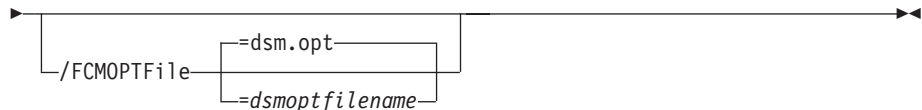
```
►                                                                   ◄►
      └/FCMOPTFile─┬─=dsm.opt────────┬─
                   └=dsmoptfilename──┘
```

Parameters:
- *existing_policy_name* (required): Specifies the name of the policy that is being copied.
- *new_policy_name* (required): Specifies the name of the new policy. The policy name must be unique.

Query Policy
> This command is used to list the attributes of a policy.

TDPSQLC command: Query POLicy

```
►►─TDPSQLC─Query POLicy─*──────────────────────────────────────────◄►
```

Parameters: * (required) Specifies all policies are to be queried. The results of the query are displayed as follows:

```
              Connecting to SQL Server, please wait...

Policy       Number of snapshots to keep    Days to keep a snapshot

--------     --------------------------     ----------

FCMPOL                    3                  60

STANDARD                  2                  30
```

Delete Policy
> This command is used to delete a policy.

TDPSQLC command: DELete POLicy

```
►►──TDPSQLC──DELete POLicy──policy_name────────────────────────────────►

►──────────────────────────────────────────────────────────────────────►◄
    │          ┌──=dsm.opt───────┐                    │
    └─/FCMOPTFile─┤                 ├──────────────────┘
               └──=dsmoptfilename──┘
```
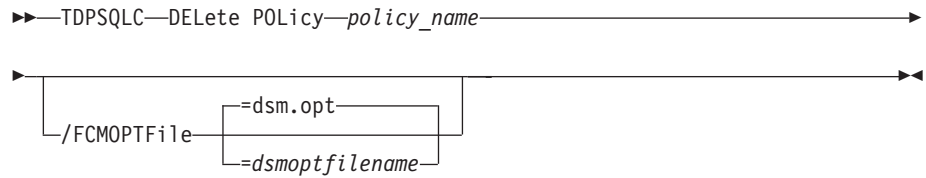
Parameter:
- *policy_name* (required): Specifies the name of the policy that is being deleted.

Query FCM command

Use the `query fcm` command to display Tivoli Storage FlashCopy Manager information.

This command displays the following information:
- Compression mode
- Active policy set
- Default management class

This command can also display a list of backups that match the databases that are entered.

Active and inactive objects can be displayed. However, only the active backup objects are displayed by default. To include inactive backup versions in the list, use the **/all** optional parameter.

Query FCM example

Use the **query fcm** command to return output about the server and other information:

```
Tivoli Storage Manager Server Connection Information
----------------------------------------------------

Nodename ............................... MALTA_EXC
NetWork Host Name of Server ............ FVTSERIES10
TSM API Version ........................ Version 7, Release 1, Level 2.0

Server Name ............................ FVTSERIES10_SERVER1_622GA
Server Type ............................ Windows
Server Version ......................... Version 7, Release 1, Level 2.0
Compression Mode ....................... Client Determined
Domain Name ............................ FCM_PDEXC
Active Policy Set ...................... STANDARD
Default Management Class ............... STANDARD

Completed
```

Query FCM syntax

Use the **query FCM** command syntax diagrams as a reference to view available options and truncation requirements.

TDPSQLC command

```
►►─TDPSQLC─Query FCM──┬─*──────────────┬──┬─FULL──────────────────────────►
                      └─dbname,dbname──┘           └─/ACtive─┘  └─/ALl─┘

►──┬────────────────────────────────────┬──────────────────────────────────►
   └─/CONFIGfile=──┬─tdpsql.cfg──────┬─┘
                   └─configfilename──┘

►──┬──────────────────────────────────┬────────────────────────────────────►
   └─/FCMOPTFile──┬─=dsm.opt─────────┬─┘
                  └─=dsmoptfilename──┘

►──┬──────────────────────────────────────┬────────────────────────────────►
   └─/FROMSQLSERVer=──┬─local SQL Server─┬─┘
                      └─server-name──────┘

►──┬──────────────────────────────┬──┬───────────────────┬──────────────────►
   └─/LOGFile=──┬─tdpsql.log──┬─┘    └─/LOGPrune=──┬─60──────┬─┘
               └─logfilename──┘                   ├─numdays─┤
                                                  └─No──────┘

►──┬──────────────────────────┬──┬──────────────────────┬──────────────────►
   └─/OBJect=──┬──────┬──────┬─┘  └─/QUERYNode──┬─=DP───────┬─┘
              │   ┌──,──┐   │                   ├─=ALWAYSON─┤
              ├─objectname──┤                   └─=BOTH─────┘
              └─*───────────┘

►──┬──────────────────────────────────┬──┬─────────────────────────┬────────►
   └─/REMOTECOMPUTER=──computername──┘    └─/REMOTECOMPUTERUser=──user─┘

►──┬──────────────────────────────────────┬────────────────────────────────►◄
   └─/REMOTECOMPUTERPassword=──passwd──┘
```

Query FCM positional parameters

Positional parameters immediately follow the **query FCM** command and precede the optional parameters.

The following positional parameters specify the object to query. If none of these positional parameters are specified, only the Tivoli Storage FlashCopy Manager API and Tivoli Storage FlashCopy Manager information is displayed:

* | *componentname*

> *componentname1, ..., componentnameN*
> > Query all backup objects for the specified component. Multiple entries are separated by commas.
> >
> > where *componentname* can be a database name.

The following positional parameters specify the type of backup to query. If this parameter is not specified, all backup types are displayed:

FULL   Query only full backup types.

COPY   Query only copy backup types.

INCR   Query only incremental backup types.

DIFF   Query only differential backup types.

Query FCM optional parameters

Optional parameters follow the **query FCM** command and positional parameters.

/ACtive

> Use the **/active** parameter to display active backup objects only. This parameter is the default.

/ALl   Use the **/all** parameter to display both active and inactive backup objects. If the **/all** parameter is not specified, only active backup objects are displayed.

/CONFIGfile=*configfilename*

> The **/configfile** parameter specifies the name of the Tivoli Storage FlashCopy Manager for SQL Server configuration file, which contains the values for the Tivoli Storage FlashCopy Manager configurable options. See "Set command" on page 351 for details on the content of the file.
>
> Considerations:
> - The *configfilename* variable can include a fully qualified path. If *configfilename* does not include a path, it uses the directory where Tivoli Storage FlashCopy Manager for SQL Server is installed.
> - If *configfilename* includes spaces, enclose it in double quotation marks.
> - If you do not specify **/configfile**, the default value is tdpsql.cfg.
> - If you specify **/configfile** but not *configfilename*, the default value tdpsql.cfg is used.

/FCMOPTFile=*dsmoptfilename*

> The **/fcmoptfile** parameter specifies the Tivoli Storage FlashCopy Manager options file to use.
>
> Considerations:
> - The *dsmoptfilename* variable can include a fully qualified path. If you do not include a path, the Tivoli Storage FlashCopy Manager installation directory is used.
> - If the *dsmoptfilename* variable spaces, enclose it in double quotation marks.
> - If you do not specify **/fcmoptfile**, the default value is dsm.opt.
> - If you specify **/fcmoptfile** but not *dsmoptfilename*, the default is also dsm.opt.

/FROMSQLSERVer=*sqlservername*

> For **query FCM**, the **/fromsqlserver** parameter specifies the SQL Server that backup objects were backed up from. This parameter is necessary only when the name of the SQL Server to query, as determined by the **/sqlserver** parameter, is different from the name of the SQL Server that the backup objects were created from. The default value is the **/sqlserver** value or the value that is set in the Tivoli Storage FlashCopy Manager for SQL Server configuration file.
>
> Considerations:

- If the two SQL Server names are different, you must use this parameter even if **/fromsqlserver** was a non-clustered default instance.
- After you restore a SQL database to a different SQL Server, the logins of the SQL database might not match the logins for the different SQL Server. If appropriate, you can use the SQL stored procedure SP_CHANGE_USERS_LOGIN to find and correct such SQL login mismatches.

/LOGFile=*logfilename*

Use the **/logfile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager for SQL Server.

The *logfilename* variable identifies the name of the activity log file.

If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *logfilename* variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager for SQL Server installation directory.

If the *logfilename* variable includes spaces, enclose the entire **/logfile** parameter entry in double quotation marks For example:

```
/LOGFile="c:\Program Files\mytdpsql.log"
```

You cannot turn Tivoli Storage FlashCopy Manager for SQL Server logging activity off. If you do not specify **/logfile**, log records are written to the default log file. The default log file is tdpsql.log.

Attention: When you use multiple simultaneous instances of Tivoli Storage FlashCopy Manager for SQL Server to run operations, use the **/logfile** parameter to specify a different log file for each instance used. This function directs logging for each instance to a different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.

/LOGPrune=*numdays***|No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, *60* days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:
- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.

- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/OBJect=* | *objectname,...*

For **restore** and **inactivate** operations, **/object** specifies that only particular backup objects for the specified SQL databases and backup object type (if specified) be restored or deactivated. For **query** operations, **/object** includes particular objects and object types in the display. The *objectname* variable specifies the names of the backup objects you want to restore or deactivate. The object name uniquely identifies each backup object and is created by Tivoli Storage FlashCopy Manager. Use **query** to view the names of backup objects. You can use * as a wildcard character in *objectname* to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all backup objects of the specified SQL databases and backup object type.

/QUERYNode=DP | **ALWAYSON** | **BOTH**

Specify whether you want to query standard databases from SQL Server 2012 and later versions that are backed up from a standard Data Protection for SQL Server node, the AlwaysOn node, or both nodes. This parameter is ignored for availability databases because the availability databases are always backed up under the AlwaysOn node.

/REMOTECOMPUTER=*computername*

Enter the IP address or host name for the remote system where you want to query the data that is backed up.

/REMOTECOMPUTERUser=*user*

Enter the user name that is used to log on to the server specified with the **REMOTECOMPUTER** parameter. If a domain is required to log on with the domain account, enter *Domain\User*. To log on to the local account, the domain is not required. There is no default value.

/REMOTECOMPUTERPassword=*passwd*

Enter the password for the user name that is specified with the **REMOTECOMPUTERUser** parameter. There is no default value.

Query Managedcapacity command

Use the **Query Managedcapacity** command to assist with storage planning by determining the amount of managed capacity in use.

Purpose

The **query managedcapacity** command displays capacity that is related information about the volumes that are represented in local inventory that is managed by Tivoli Storage FlashCopy Manager. This command is valid for all Windows operating systems that are supported by Tivoli Storage FlashCopy Manager.

TDPSQLC command

```
►►──TDPSQLC──Query MANAGEDCAPacity─────────────────────────►◄
                                  └─/DETAILED─┘
```

Parameters

/DETAILED

Results in a detailed listing of snapped volumes. If this option is not specified, then only the total capacity is displayed.

SQL Server 2008 example

Query the total managed capacity of SQL Server 2008 data that is represented in the local inventory with a detailed listing of snapped volumes.

Command: `tdpsqlc query managedcapacity /detailed`

```
Total Managed Capacity : 63.99 GB (68,706,877,440 bytes)

Volume           : H:
Managed Capacity : 16.00 GB (17,176,719,360 bytes)

Volume           : I:
Managed Capacity : 16.00 GB (17,176,719,360 bytes)

Volume           : Q:
Managed Capacity : 16.00 GB (17,176,719,360 bytes)

Volume           : N:
Managed Capacity : 16.00 GB (17,176,719,360 bytes)
```

Query SQL command

The **query sql** command queries the local SQL Server to return general information and status about the SQL Server, databases, and VSS components.

Use the **query sql** command to return the following information:
- SQL Server information:
  - SQL Server name and version
  - Database name
  - Database data space allocated
  - Database space that is used
  - Database log space allocated
  - Database log space used
  - Database options that are set (SELECT INTO / BULK COPY, TRUNCATE LOG ON CHECKPOINT, and other options.)
- VSS information:
  - Writer Name
  - Local DSMAgent Node
  - Remote DSMAgent Node
  - Writer Status (online, offline)
  - Number of selectable components
- If you specify **/compatibilityinfo**:
  - Server clustering state
  - Database compatibility level

Query SQL syntax

Use the **query sql** command syntax diagrams as a reference to view available options and truncation requirements.

TDPSQLC command

```
►►─TDPSQLC─Query SQL──────────────────────────────────────────────────────►
                        └─/COMPATibilityinfo─┘

►─────────────────────────────────────────────────────────────────────────►
   └─/CONFIGfile=─┬─tdpsql.cfg──────┬─┘    └─/LOGFile=─┬─tdpsql.log─────┬─┘
                  └─configfilename──┘                  └─logfilename────┘

►─────────────────────────────────────────────────────────────────────────►
   └─/LOGPrune=─┬─60──────┬─┘
               ├─numdays──┤
               └─No───────┘

►─────────────────────────────────────────────────────────────────────────►
   └─/SQLAUTHentication──┬─=INTegrated [or cfg value]─┬─┘
                         └─=SQLuserid─────────────────┘

►─────────────────────────────────────────────────────────────────────────►
   └─/SQLCHECKSum=─┬─No──┬─┘    └─/SQLPassword─┬─=" "────────────────┬─┘
                  └─Yes─┘                      └─=sqlpasswordname────┘

►─────────────────────────────────────────────────────────────────────────►
   └─/SQLSERVer─┬─=[local computer name or cfg value]─┬─┘
               └─=sqlprotocol:sqlservername──────────┘

►─────────────────────────────────────────────────────────────────────────►◄
   └─/SQLUSer─┬─=sa──────────┬─┘
             └─=sqlusername──┘
```

Query SQL positional parameters

Positional parameters immediately follow the **query** command and precede the optional parameters.

Specify one of the following when you issue a Tivoli Storage FlashCopy Manager for SQL Server **query** command:

Query SQL * | *dbname,...*
> This displays information about the current SQL Server. The *dbname* variable specifies databases on the current SQL Server to display information about.

Query SQL optional parameters

Optional parameters follow the **query sql** command and positional parameters.

/COMPATibilityinfo

For **query** operations, this parameter displays information that is related to the compatibility of a backup object with a SQL Server. Certain SQL Server configuration options must be compatible before you can restore a backup object to a SQL Server. When you specify this parameter, SQL and Tivoli Storage FlashCopy Manager for SQL Server configuration information is listed to help you determine whether a backup object is correct for a SQL Server.

Considerations:
- Compatible generally means identical. However, if you use a binary sort order for both the SQL Server and the backup object, the code pages might be different, although the interpretation of individual character values might result in different characters that are displayed or printed.

/CONFIGfile=*configfilename*

Use the **/configfile** parameter to specify the name (*configfilename*) of the Tivoli Storage FlashCopy Manager for SQL Server configuration file that contains the values to use for a **query sql** operation.

The *configfilename* variable can include a fully qualified path. If the *configfilename* variable does not include a path, the Tivoli Storage FlashCopy Manager for SQL Server installation directory is used. If the **/configfile** parameter is not specified, or if the *configfilename* variable is not specified, the default value is tdpsql.cfg.

If the *configfilename* variable includes spaces, enclose the entire **/configfile** parameter entry in double quotation marks. For example:

```
/CONFIGfile="c:\Program Files\file.cfg"
```

See Set positional parameters for descriptions of available configuration parameters.

/LOGFile=*logfilename*

Use the **/logfile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager for SQL Server. The *logfilename* variable identifies the name of the activity log file. If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *logfilename* variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager for SQL Server installation directory. If the *logfilename* variable includes spaces, enclose the entire **/logfile** parameter entry in double quotation marks. For example:

```
/LOGFile="c:\Program Files\mytdpsql.log"
```

If the **/logfile** parameter is not specified, log records are written to the default log file, tdpsql.log. The **/logfile** parameter cannot be turned off, logging always occurs.

When you use multiple simultaneous instances of Tivoli Storage FlashCopy Manager for SQL Server to run operations, use the **/logfile** parameter to specify a different log file for each instance used. This function directs logging for each instance to a different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.

/LOGPrune=*numdays***|No**

> When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, *60* days of log entries are saved. The option No can be entered to disable log pruning.
>
> Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.
>
> Considerations:
> - For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
> - If you specify *no*, the log file is not pruned.
> - If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
> - If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
> - You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
> - Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
>   - Make a copy of the existing log file.
>   - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/SQLAUTHentication=INTegrated | SQLuserid

> This parameter specifies the authorization mode that is used when you log on to the SQL Server. The **integrated** value specifies Windows authentication. The user ID you use to log on to Windows is the same ID you use to log on to the SQL Server. This option is the default value. Use the *sqluserid* value to specify SQL Server user ID authorization. The user ID specified by the **/sqluserid** parameter is the ID you use to log on to the SQL Server. Any SQL user ID must have the SQL Server SYSADMIN fixed server role.

/SQLCHECKSum=No|Yes

> Use the **SQLCHECKSum** parameter to verify the integrity of a legacy database backup.
>
> You can specify the following values:
>
> **No**   Do not enable the checksum option for a legacy database backup. This option is the default option.
>
> **Yes**   Enable the checksum option to verify that a legacy database backup is consistent and correct.

/SQLPassword=*sqlpasswordname*

> This parameter specifies the SQL password that Tivoli Storage FlashCopy Manager uses to log on to the SQL Server that objects are backed up from or restored to.
>
> Considerations:

- Using this parameter means that you are using SQL Server authentication. The SQL Server and the SQL user ID for this password must both be configured for SQL Server authentication.
- If you do not specify **/sqlpassword**, the default value is blank (" ").
- If you specify **/sqlpassword** but not *sqlpasswordname*, the default is also blank (" ").
- This parameter is ignored if you use the **/sqlauth=integrated** parameter with it.

/SQLSERVer=_sqlprotocol:sqlservername_

The **/sqlserver** parameter specifies the SQL Server that Tivoli Storage FlashCopy Manager logs on to. The *sqlprotocol* variable specifies the communication protocol to use. You can specify one of the following protocols:

- *lpc*: Use Shared Memory protocol.
- *np*: Use Named Pipes protocol.
- *tcp*: Use Transmission Control protocol.
- *via*: Use Virtual Interface Architecture protocol.

If no protocol is specified, Tivoli Storage FlashCopy Manager logs on to the SQL Server according to the first protocol that becomes available.

Considerations:

- The default value is the value that is specified by the SQL Server configurable option in the Tivoli Storage FlashCopy Manager configuration file. This value is initially the local computer name.
- If you specify **/sqlserver** but not *sqlservername*, the local computer name is used.
- The following two shortcuts are accepted as the local computer name:
  .   (local) These shortcuts are a period or the word *local* within parentheses.
- You must specify the name if the SQL Server is not the default instance or is a member of a failover cluster.
- The format of *sqlservername* depends on what type of instance it is and whether it is clustered or not:

Format	Instance?	Clustered?	Name required?
local-computername	default	no	no
local-computername\ instancename	named	no	yes
virtualservername	default	yes	yes
virtualservername\ instancename	named	yes	yes

localcomputername
> The network computer name of the computer the SQL Server and Tivoli Storage FlashCopy Manager are on. The TCP/IP host name might not always be the same.

instancename
> The name that is given to the named instance of SQL Server that is specified during installation of the instance.

virtualservername

> The name that is given to the clustered SQL Server specified during clustering service setup. This name is not the cluster or node name.

/SQLUSer=*sqlusername*

> The **/sqluser** parameter specifies the name that Tivoli Storage FlashCopy Manager uses to log on to the SQL Server.
>
> Considerations:
>
> * Using this parameter means that you are using SQL Server authentication. The SQL Server and the SQL user ID for this password must both be configured for SQL Server authentication.
> * The SQL user ID must have the SQL Server SYSADMIN fixed server role.
> * If you do not specify **/sqluser**, the default is sa.
> * If you specify **/sqluser** but not *sqlusername*, the default is also sa.
> * This parameter is ignored if you use the **/sqlauth=integrated** parameter with it.

Query SQL example

This output example provides a sample of the text, messages, and process status that displays when you use the **query SQL** command.

In this example, the **tdpsqlc query sql** command queried the local SQL Server to return general information and status about the SQL Server, databases, and VSS components. The following output is displayed:

```
Connecting to SQL Server, please wait...

SQL Server Information
----------------------

SQL Server Name    ........................ VADER
SQL Server Version ........................ 10.0.1600 (SQL Server 2008)


Volume Shadow Copy Service (VSS) Information
--------------------------------------------

Writer Name          : SqlServerWriter
Local DSMAgent Node  : VADER
Remote DSMAgent Node :
Writer Status        : Online
Selectable Components : 13
```

Query TDP command

Use the **query tdp** command to query a list of the current values set in the configuration file for Tivoli Storage FlashCopy Manager for SQL Server.

Query TDP syntax

Use the **query TDP** command syntax diagrams as a reference to view available options and truncation requirements.

TDPSQLC command

```
►►──TDPSQLC──Query TDP──────────────────────────────────────────────────►
                        │                  ┌─tdpsql.cfg────┐            │
                        └─/CONFIGfile=──────┤               ├───┘
                                            └─configfilename─┘
```

```
►──────────────────────────────────────────────────────────────────────►◄
  │              ┌─tdpsql.log───┐         │                 ┌─60──────┐ │
  └─/LOGFile=────┤              ├─┘       └─/LOGPrune=──────┼─numdays─┤─┘
                 └─logfilename──┘                          └─No──────┘
```

Query TDP optional parameters

Optional parameters follow the **query TDP** command.

/CONFIGfile=_configfilename_

> Use the **/configfile** parameter to specify the name (_configfilename_) of the Tivoli Storage FlashCopy Manager for SQL Server configuration file that contains the values to use for a **query tdp** operation.
>
> The _configfilename_ variable can include a fully qualified path. If the _configfilename_ variable does not include a path, the Tivoli Storage FlashCopy Manager for SQL Server installation directory is used. If the **/configfile** parameter is not specified, or if the _configfilename_ variable is not specified, the default value is tdpsql.cfg
>
> If the _configfilename_ variable includes spaces, enclose the entire **/configfile** parameter entry in double quotation marks. For example:
>
> /CONFIGfile="c:\Program Files\file.cfg"
>
> See "Set positional parameters" on page 352 for descriptions of available configuration parameters.

/LOGFile=_logfilename_

> Use the **/logfile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager for SQL Server.
>
> The _logfilename_ variable identifies the name of the activity log file.
>
> If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The _logfilename_ variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager for SQL Server installation directory.
>
> If the _logfilename_ variable includes spaces, enclose the entire **/logfile** parameter entry in double quotation marks. For example:
>
> /LOGFile="c:\Program Files\mytdpsql.log"
>
> If the **/logfile** parameter is not specified, log records are written to the default log file, tdpsql.log.
>
> The **/logfile** parameter cannot be turned off, logging always occurs.
>
> When you use multiple simultaneous instances of Tivoli Storage FlashCopy Manager for SQL Server to run operations, use the **/logfile** parameter to specify a different log file for each instance used. This function directs

logging for each instance to a different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.

/LOGPrune=_numdays_ | **No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, _60_ days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:

- For _numdays_, the range is _0_ to _9999_. A value of _0_ deletes all entries in the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is _60_.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying _numdays_ or _no_; in this case, the default value, _60_, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

Query TDP example

This output example provides a sample of the text, messages, and process status that displays when you use the **query TDP** command.

In this example, the **tdpsqlc query tdp** command queried a list of the current values that are set in the configuration file for Tivoli Storage FlashCopy Manager. The following output is displayed:

```
IBM Tivoli Storage FlashCopy Manager configuration settings
---------------------------------------------------
CONFIGfile................................ tdpsql.cfg
LOGFile .................................. tdpsql.log
LOGPrune ................................. 60
```

Restore command

Use this command to restore one (or more) SQL databases from storage that is managed by Tivoli Storage FlashCopy Manager to a SQL Server.

Considerations:

- You cannot restore SQL databases currently in use. By placing SQL databases to be restored in single-user mode, you can avoid attempting such restores. If you are restoring the master database, you must start the SQL Server in single-user mode by using the -m SQL SERVER startup option.

  Note:

  1. The single user of the SQL databases or server must be the same user that Tivoli Storage FlashCopy Manager uses to log on to the SQL Server for the restore.
  2. SQL Enterprise Manager, SQL Server Application Client, and other SQL Server services can be users of databases and the SQL Server.

- The user that is used by Tivoli Storage FlashCopy Manager to log on to the SQL Server must have the SQL Server SYSADMIN fixed server role.
- You can use the TRANSACT-SQL database consistency checker statement DBCC CHECKDB ('DBNAME') to verify the integrity of the restored SQL databases.

Restore syntax

Use the **restore** command syntax diagrams as a reference to view available options and truncation requirements.

Syntax

TDPSQLC command

```
                          ,
                       ┌──<──┐
►►─TDPSQLC─Restore──┬─ dbname ─┬──FULL──┬─────────────────────────────────────┬──►
                    └─   *    ─┘        │                  ┌─=tdpsql.cfg──────┐ │
                                        └─/CONFIGfile──┬───┴──────────────────┴─┘
                                                       └─=configfilename──────┘

►───┬─────────────────────────────────┬───────────────────────────────────────►
    │             ┌─=dsm.opt─────────┐ │
    └─/FCMOPTFile─┴──────────────────┴─┘
                  └─=dsmoptfilename───┘

►───┬──────────────────────────────────────────────────┬──┬──────────────────────────┬──►
    │                ┌─=sqlserver value [or cfg value]─┐ │  │               ┌─Yes─┐    │
    └─/FROMSQLSERVer=┴─────────────────────────────────┴─┘  └─/INSTANTRestore=┴─No──┘
                     └─=sqlservername──────────────────┘

►───┬─────────────────┬──┬──────────────────────────────────────┬──►
    └─/INTO=─dbname──┘   │          ┌─=tdpsql.log [or cfg value]─┐ │
                         └─/LOGFile─┴────────────────────────────┴─┘
                                    └─=logfilename───────────────┘
```

```
►──┬──────────────────────────────────────┬──┬──────────────────────────┬──►
   │              ┌─=60 [or cfg value]─┐   │  │              ┌──,───┐     │
   └─/LOGPrune────┼────────────────────┤   │  └─/OBJect=────▼─objectname─┴──┤
                  ├─=numdays───────────┤   │                └─*─────────────┘
                  └─=No────────────────┘   │
```

```
►──┬──────────────────────────┬──┬────────┬──►
   │          ┌─=DP────────┐   │  │        │
   └─/QUERYNode─┼──────────────┤   │  └─/Quiet─┘
              └─=ALWAYSON──┘   │
```

```
            ┌─=Yes─┐                                    ┌──,───────┐      ┌──dbfiledir─┐
►──/RECOVery─┼──────┼──/RELOCATEDir=──dbfiledir──[──────▼─logfiledir──[──┴────────────┴──►
            └─=No──┘
```

```
      ┌──,───────────┐             ┌──dbfiledir─┐    ┌──,─────────────┐            ┌──dbfiledir─┐
►─────▼─otherfiledir──]──]──────────┴────────────┘    ▼─filestream files──]──]──────┴────────────┘──►
```

```
►──┬─────────────────────────────┬──┬─────────────────────────────┬──►
   │              ┌─current date─┐ │  │              ┌─current time─┐ │
   └─/RESTOREDAte──┴─=date────────┘ │  └─/RESTORETime──┴─=time────────┘ │
```

```
►──┬─────────────────────────────────────────────────┬──►
   │                    ┌─=INTegrated [or cfg value]─┐ │
   └─/SQLAUTHentication──┼───────────────────────────┤ │
                        └─=SQLuserid────────────────┘ │
```

```
►──┬─────────────────────────────────┬──►
   │             ┌─=" "────────────┐  │
   └─/SQLPassword─┼─────────────────┤  │
                 └─=sqlpasswordname─┘  │
```

```
►──┬──────────────────────────────────────────────────────┬──►
   │           ┌─=[local computer name or cfg value]─┐     │
   └─/SQLSERVer──┼─────────────────────────────────────┤   │
               └─=sqlprotocol:sqlservername──────────┘     │
```

```
►──┬──────────────────────────────┬──┬──────────────┬──►◄
   │         ┌─=sa──────────┐      │  │              │
   └─/SQLUSer──┼──────────────┤      │  └─/VerifyOnly─┘
             └─=sqlusername─┘      │
```

Restore positional parameters

Positional parameters immediately follow the **restore** command and precede the
optional parameters.

FULL   This option restores all full database backup objects for the SQL databases
that you specify.

Restore optional parameters

Optional parameters are used with the **restore** command and positional parameters.

The following are detailed descriptions of each of the optional parameters:

/CONFIGfile=configfilename

The **/CONFIGfile** parameter specifies the name of the Tivoli Storage FlashCopy Manager configuration file, which contains the values for the Tivoli Storage FlashCopy Manager configurable options. See "Set command" on page 351 for details on the contents of the file. Considerations:

- configfilename can include a fully qualified path. If configfilename does not include a path, it uses the directory where Tivoli Storage FlashCopy Manager is installed.
- If configfilename includes spaces, place it in double quotation marks.
- If you do not specify **/CONFIGfile**, the default value is tdpsql.cfg.
- If you specify **/CONFIGfile** but not configfilename, the default value tdpsql.cfg is used.

/FCMOPTFile=dsmoptfilename

The **/FCMOPTFile** parameter specifies the Tivoli Storage FlashCopy Manager options file to use. Considerations:

- The *dsmoptfilename* variable can include a fully qualified path. If you do not include a path, the Tivoli Storage FlashCopy Manager installation directory is used.
- If the *dsmoptfilename* variable spaces, enclose it in double quotation marks.
- If you do not specify **/FCMOPTFile**, the default value is dsm.opt.
- If you specify **/FCMOPTFile** but not dsmoptfilename, the default is also dsm.opt.

/FROMSQLSERVer=sqlservername

For **restore**, the **/fromsqlserver** parameter specifies the SQL server that backup objects were backed up from. This parameter is necessary only when the name of the SQL Server to restore to, as determined by the **/sqlserver** parameter, is different from the name of the SQL Server that the backup objects were created from. Use **/fromsqlserver** for **query FCM** commands, but use **/sqlserver** for **query SQL** commands. The default value is the **/sqlserver** value or the value that is set in the Tivoli Storage FlashCopy Manager configuration file. If the two SQL Server names are different, you must use this parameter even if **/fromsqlserver** was a non-clustered default instance.

/INSTANTRestore=Yes|No

Use the **/INSTANTRestore** parameter to specify whether to use volume level snapshot or file level copy to restore a VSS backup that is stored on local shadow volumes. An IBM Systems Storage SAN Volume Controller, DS8000, the XIV system, and IBM Storwize V7000 storage subsystem is required to run VSS instant restores.

You can specify:

Yes   Use volume level snapshot restore for a VSS backup that is stored on local shadow volumes if the backup exists on volumes that support it. This option is the default.

No Use file-level copy to restore the files from a VSS backup that is stored on local shadow volumes. Bypassing volume-level copy means that SQL database files and log files are the only data overwritten on the source volumes.

When you are running VSS instant restore on DS8000 and Storwize family, ensure that any previous background copies that involve the volumes you are restoring, complete before you initiate the VSS instant restore operation.

/INTO=dbname

For **restore** operations, **/INTO** specifies the SQL Server database that you want a backup object that is restored into. This parameter is necessary only when the name of the SQL Server database to restore into is different from the backup object database name. Considerations:

- When you specify **/INTO**, wildcards (*) might not be used in either the command *dbname* variable or the **/INTO** *dbname* variable.

- There must be exactly one item in the **/INTO** *dbname* variable list in addition to in the command *dbname* list.

- Make sure to use the **/relocatedir** parameter when you specify **/INTO** *dbname*.

/LOGFile=logfilename

The **/LOGFile** parameter specifies the name of the activity log that is generated by Tivoli Storage FlashCopy Manager. This activity log records significant events such as completed commands and error messages. The Tivoli Storage FlashCopy Manager activity log is distinct from the SQL Server error log. The **/LOGFile=** variable identifies the name to be used for the activity log generated by Tivoli Storage FlashCopy Manager. Considerations:

- If the specified file does not exist, it is created. If it does exist, new log entries are appended to the file.

- The file name can include a fully qualified path; however, if you specify no path, the file is written to the directory where Tivoli Storage FlashCopy Manager is installed.

- You cannot turn off Tivoli Storage FlashCopy Manager logging activity. If you do not specify **/LOGFile**, log records are written to the default log file. The default log file is tdpsql.log.

- When you use multiple simultaneous instances of Tivoli Storage FlashCopy Manager for operations, use the **/LOGFile** parameter to specify a different log file for each instance used. This function directs logging for each instance to a different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.

/LOGPrune=_numdays_**|No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, _60_ days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:

- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/OBJect=*|objectname,...

For restore and deactivate operations, **/OBJect** specifies that only particular backup objects for the specified SQL databases and backup object type if specified are restored. For query operations, **/OBJect** includes particular objects and object types in the display. The *objectname* variable specifies the names of the backup objects you want to restore or deactivate. The object name uniquely identifies each backup object and is created by Tivoli Storage FlashCopy Manager. Use **query** to view the names of backup objects. Considerations:

- If you do not specify restore, only the active backup object is included in the restore.
- You can use * as a wildcard character in objectname to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all backup objects of the specified SQL databases and backup object type.

/QUERYNode=DP|ALWAYSON

Specify whether you want to query standard databases from SQL Server 2012 that were backed up from a standard Data Protection for SQL Server node or the AlwaysOn node. This parameter is ignored for availability databases because the availability databases are always backed up under the AlwaysOn node. The default value is DP. To query backups of AlwaysOn Availability databases, specify /QUERYNode = ALWAYSON.

/Quiet The **/Quiet** parameter omits displaying status information from the command. However, the information is appended to the Tivoli Storage FlashCopy Manager activity log.

/RECOVery=Yes|No

For restore operations, **/RECOVery** specifies whether you want to restore more to a SQL database that is not on a standby SQL Server. A restored database cannot be used until the **/RECOVery=yes** parameter is administered to the database. You can specify:

Yes (default)

Use when you make a sequence of restores to a SQL database and the current restore is the final in the sequence. Also, use this option

when the restore operation is the only restore operation to a SQL database. This option informs the SQL Server that the restore is complete and ready for incompleted transactions to be rolled back.

No Whenever you make a sequence of restores to a SQL database and the current restore is not the final restore in the sequence.

Not specifying this option automatically rolls back incomplete transactions for the database.

Tivoli Storage FlashCopy Manager sorts the restore objects by database name, and, within database name, by backup time from earliest to latest time. A **query FCM** command also displays this order.

/RELOCATEDir=dbfiledir [,logiledir [,otherfiledir] [,filestream files]]
The **/RELOCATEDir** parameter specifies the new destination locations in which to restore the backed up SQL databases, logs, and SQL Server full-text index files. FILESTREAM files are included for SQL Server 2008 or later versions.

The *dbfiledir* variable specifies the directory location of the SQL database you want to relocate. Note, if the *logfiledir* and *otherfiledir* variables are not specified, the logs and SQL Server full-text index files are restored to the directory specified by *dbfiledir*.

The *logfiledir* variable specifies the directory location of the SQL log files you want to relocate. Note, if the *logfiledir* variable is not specified, the SQL log files are restored to the directory specified by *dbfiledir*.

The *otherfiledir* variable specifies the directory location of the SQL Server full-text index files you want to relocate. Note, that if the *otherfiledir* variable is not specified, the SQL Server full-text index files are restored to the directory specified by *dbfiledir*.

The *filestream files* variable specifies the directory location of the SQL Server FILESTREAM data files (SQL Server 2008 or later versions) you want to relocate. Note, if the *filestream files* variable is not specified, the SQL Server FILESTREAM data files are restored to the directory specified by *dbfiledir*. *Filestream files* is available for SQL Server 2008 only.

/RESTOREDAte=date
The **/RESTOREDAte** parameter specifies a date to which the database identified by *dbname* is to be recovered. The date value must be specified in the same date format that is defined in the Tivoli Storage FlashCopy Manager preferences file. If **/RESTOREDAte** is not specified but **/RESTORETime** is specified, the **/RESTOREDAte** value is the current date. It can be specified only when you restore a full database backup. The **/RESTORETime** parameter cannot be used to restore file, group, and set backups.

/RESTORETime=time
The **/RESTORETime** parameter specifies the time of day to which the database identified by *dbname* is to be recovered. The time value must be specified in the same time format that is defined in the Tivoli Storage FlashCopy Manager preferences file. If **/RESTORETime** is not specified but **/RESTOREDAte** is specified, the **/RESTORETime** is the current time. It can be specified only when you restore a full database backup. The **/RESTORETime** parameter cannot be used to restore file, group, and set backups.

/SQLAUTHentication=INTegrated | SQLuserid
This parameter specifies the authorization mode that is used when you log on to the SQL Server. The `integrated` value specifies Windows

authentication. The user ID you use to log on to Windows is the same id you use to log on to the SQL Server. This option is the default value. Use the `sqluserid` value to specify SQL Server user ID authorization. The user ID specified by the `/sqluserid` parameter is the id that you use to log on to the SQL Server. Any SQL user ID must have the SQL Server SYSADMIN fixed server role.

/SQLPassword=sqlpasswordname

This parameter specifies the SQL password that Tivoli Storage FlashCopy Manager uses to log on to the SQL Server that objects are backed up from or restored to. Considerations:

- Using this parameter means that you are using SQL Server authentication. The SQL Server and the SQL user ID for this password must both be configured for SQL Server authentication.
- If you do not specify **/SQLPassword**, the default value is blank (" ").
- If you specify **/SQLPassword** but not **sqlpasswordname**, the default is also blank (" ").

This parameter is ignored if you use the **/sqlauth=integrated** parameter with it.

/SQLSERVer=sqlprotocol:sqlservername

The **/SQLSERVer=** parameter specifies the SQL Server that Tivoli Storage FlashCopy Manager logs on to. For restore operations, this SQL Server is the one that backup objects are restored to. However, if the backup objects were created from a different SQL Server name, you must use the **/fromsqlserver** parameter. Use **/sqlserver** for the **query SQL** and **backup** commands, but use **/fromsqlserver** for **query FCM** commands. The *sqlprotocol* variable specifies the communication protocol to use. You can specify one of the following protocols:

- `lpc`: Use Shared Memory protocol.
- `np`: Use Named Pipes protocol.
- `tcp`: Use Transmission Control protocol.
- `via`: Use Virtual Interface Architecture protocol.

If no protocol is specified, Tivoli Storage FlashCopy Manager logs on to the SQL Server according to the first protocol that becomes available. Considerations:

- The default value is the value that is specified by the SQL Server configurable option in the Tivoli Storage FlashCopy Manager configuration file. This value is initially the local computer name.
- If you specify **/sqlserver** but not **sqlservername**, the local computer name is used.
- The following two shortcuts are accepted as the local computer name: `.` `(local)` These shortcuts are a period or the word `local` within parentheses.
- You must specify the name if the SQL Server is not the default instance or is a member of a failover cluster.
- The format of **sqlservername** depends on what type of instance it is and whether it is clustered or not:

Format	Instance?	Clustered?	Name required?
local-computername	default	no	no

Format	Instance?	Clustered?	Name required?
local-computername\ instancename	named	no	yes
virtualservername	default	yes	yes
virtualservername\ instancename	named	yes	yes

localcomputername
The network computer name of the computer the SQL Server and Tivoli Storage FlashCopy Manager are stored. The TCP/IP host name might not always be the same.

instancename
The name that is given to the named instance of SQL Server that is specified during installation of the instance.

virtualservername
The name that is given to the clustered SQL Server specified during clustering service setup. This name is not the cluster or node name.

/SQLUSer=sqlusername
The **/SQLUSer** parameter specifies the name that Tivoli Storage FlashCopy Manager uses to log on to the SQL Server. Considerations:

- Using this parameter means that you are using SQL Server authentication. The SQL Server and the SQL user ID for this password must both be configured for SQL Server authentication.
- The SQL user ID must have the SQL Server SYSADMIN fixed server role.
- If you do not specify **/SQLUSer**, the default is sa.
- If you specify **/SQLUSer** but not **sqlusername**, the default is also sa.
- This parameter is ignored if you use the **/sqlauth=integrated** parameter with it.

/VerifyOnly
The **/VerifyOnly** parameter specifies whether the integrity of a legacy database backup is verified. Before you restore a backup, you can use this parameter to evaluate whether the backup is complete and can be read. By default, the integrity of a legacy database backup is not verified.

Restriction: The **/VerifyOnly** parameter is available only for legacy database backups. This parameter is only a command optional parameter, and it cannot be set as a configuration option.

Restore output examples

These output examples provide a sample of the text, messages, and process status that displays when you use the **restore** command.

In this example, the **tdpsqlc restore db1 full** command restores a full backup of database *db1*. The following output is displayed:

```
IBM FlashCopy Manager for Databases:
FlashCopy Manager for Microsoft SQL Server
Version 7, Release 1, Level 2.0
(C) Copyright IBM Corporation 1997, 2015. All rights reserved.

Connecting to SQL Server, please wait...

Querying Virtual Server for Backups ....

Starting Sql database restore...


Beginning VSS restore of 'db1'...


Files Examined/Completed/Failed: [ 3 / 3 / 0 ] Total Bytes: 6029825

VSS Restore operation completed with rc = 0
Files Examined : 3
Files Completed : 3
Files Failed : 0
Total Bytes : 6029825
```

Restorefiles command

Use the **restorefiles** command to restore VSS-based backups on theTivoli Storage Manager (/BACKUPDESTINATION=TSM), or stored locally (/BACKUPDESTINATION=LOCAL).

Considerations

- The **restorefiles** command restores .mdf, ldf, and other flat files from a specified Tivoli Storage Manager VSS-based backup into a specified directory.
- A destination directory can be specified as a directory on a fixed file system such as C:\temp, or on a network share that is accessible to the Tivoli Storage FlashCopy Manager Remote Agent (VSS Requestor)
- The **restorefiles** command does not restore the data to the SQL Server.
- This command does not require the SQL Server to be installed on the system where the **restorefiles** command is run.
- A restore continues until it is completed unless the destination volume does not have enough space to fulfill the restore operation.
- VSS-based backups that are on the Tivoli Storage FlashCopy Manager (/BACKUPDESTINATION=TSM) can be restored by using **restorefiles** on the same system that ran the VSS-based backup, or by running the command on a system that installed and configured the Tivoli Storage FlashCopy Manager client.
- The directory that is specified in the **restorefiles** command appended the VSS component name so that multiple databases can be restored to the same target directory.
- VSS-based backups that are stored on the local system by using a persistent snapshot (/BACKUPDESTINATION=LOCAL), can be restored only by running the **restorefiles** command on the same system that ran the VSS-based backup, and has access to the persistent snapshot.
- To run a full restore: tdpsqlc restorefiles DBName1 FULL /backupmethod=vss /relocatedir=d:\temprestore
- Use /RELOCATEDIR to specify the destination directory for the flat files. If this option is not specified, the destination directory defaults to the current working directory.

- If you are in a non-clustered environment, you can restore only a local snapshot to the system that generated the snapshot. Or for cluster environments, you can run a **restorefiles** command from any of the systems in the cluster.

Restorefiles syntax

Use the **restorefiles** command syntax diagram as a reference for available options and truncation requirements.
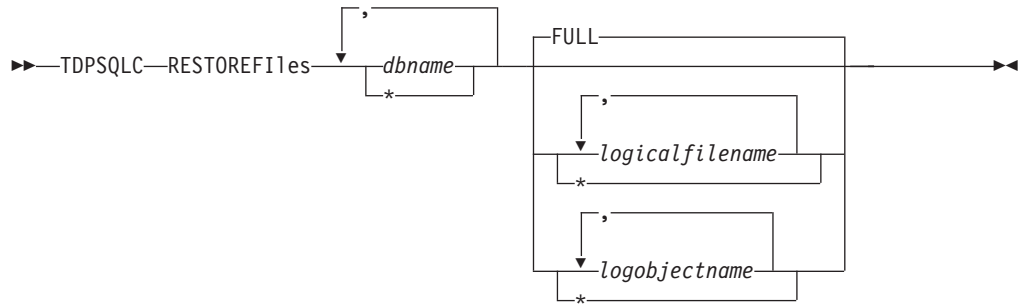
TDPSQLC command

```
                                    ┌─,─────┐
                                    │       │        ┌─FULL─────────────────────────┐
►►──TDPSQLC──RESTOREFIles──▼──dbname─┴─┐──────┤                              ├──►◄
                           └─*─┘
                                          ┌─,───────────────┐
                                          ▼──logicalfilename─┴─┐
                                          └─*─┘
                                          ┌─,─────────────┐
                                          ▼──logobjectname─┴─┐
                                          └─*─┘
```

Restorefiles positional parameters

Positional parameters immediately follow the **restorefiles** command and precede the optional parameters.

The following positional parameters specify the object to restore:

TDPSQLC * | *componentname1*, ..., *componentnameN* **FULL**

> ***** Sequentially restore all flat files for the database.

The following positional parameter specifies the type of backup from which the files are restored:

FULL Restore the files from a full type backup for VSS.

Restorefiles optional parameters

Optional parameters follow the **restorefiles** command and positional parameters.

/BACKUPDESTINATION
> VSS backups that are on the Tivoli Storage Manager server are restored by using the **restorefiles** command with /BACKUPDESTINATION=TSM. VSS backups that are running on a local system that uses a persistent snapshot are restored by using the **restorefiles** command with /BACKUPDESTINATION=LOCAL. TSM is the default destination for **restorefiles**.

/CONFIGfile=*configfilename*
> Use the **/configfile** parameter to specify the name of the Tivoli Storage FlashCopy Manager configuration file that contains the values for the Tivoli Storage FlashCopy Manager configuration options.
>
> The *configfilename* variable can include a fully qualified path. If the *configfilename* variable does not include a path, the Tivoli Storage FlashCopy Manager installation directory is used. If the **/configfile** parameter is not specified, or if the *configfilename* variable is not specified, the default value is tdpsql.cfg.

If the *configfilename* variable includes spaces, enclose the entire **/configfile** parameter entry in double quotation marks. For example:

/CONFIGfile="c:\Program Files\file.cfg"

/FROMSQLserver=*sqlservername*

Use the **/FROMSQLserver** parameter to specify the name of the SQL Server where the original backup was completed. The default is the local SQL Server name. To restore availability databases, specify the AlwaysOn Availability group.

/LOGFile=*logfilename*

Use the **/logfile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager.

The *logfilename* variable identifies the name of the activity log file.

If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *logfilename* variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager installation directory.

If the *logfilename* variable includes spaces, enclose the entire **/logfile** parameter entry in double quotation marks. For example:

/LOGFile="c:\Program Files\mytdpsqlserver.log"

If the **/logfile** parameter is not specified, log records are written to the default log file, tdpsqlserver.log.

The **/logfile** parameter cannot be turned off, logging always occurs.

When you use multiple simultaneous instances of Tivoli Storage FlashCopy Manager to run operations, use the **/logfile** parameter to specify a different log file for each instance used. This function directs logging for each instance to a different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.

/LOGPrune=*numdays* **| No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, *60* days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:

• For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
• If you specify no, the log file is not pruned.
• If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
• If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.

- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/MOUNTWait=Yes | No

The **/MOUNTWait** parameter is used to specify whether Tivoli Storage FlashCopy Manager waits for removable media to mount, such as tapes or CDs, or stops the operation. This situation occurs when the Tivoli Storage FlashCopy Manager is configured to store backup data on removable media and waits for a required storage volume to be mounted. This parameter is not valid for all backup types; the parameter does not work with DIFFFULL or LOG backup types.

You can specify these options:

Yes   Wait for tape mounts. This option is the default.

No   Do not wait for tape mounts.

/OBJect=*object name*

Use the **/object** parameter to specify the name of the backup object files that you want to restore. The object name uniquely identifies each backup object and is created by Tivoli Storage FlashCopy Manager.

Use the Tivoli Storage FlashCopy Manager **query tsm** command to view the names of the backup objects.

/Quiet   This parameter prevents status information from being displayed. This function does not affect the level of information that is written to the activity log.

/RELOCATEDir=*dbfiledir*[,*logfiledir* [,*otherfiledir*] [,*filestream files*]]

The **/relocatedir** parameter specifies the destination locations in which to restore the flat files. This restore includes databases, logs, and FILESTREAM files.

The *dbfiledir* variable specifies the directory location of the SQL database you want to relocate. If the *logfiledir* or *otherfiledir* variables are not specified, the logs and SQL Server full-text index files are restored to the directory specified by *dbfiledir*.

The *logfiledir* variable specifies the directory location of the SQL log files you want to relocate. If the *logfiledir* variable is not specified, the SQL log files are restored to the directory specified by *dbfiledir*.

The *otherfiledir* variable specifies the directory location of the SQL Server full-text index files you want to relocate. If the *otherfiledir* variable is not specified, the SQL Server full-text index files are restored to the directory specified by *dbfiledir*.The **restorefiles** operation creates a subdirectory under the root directory that contains the name of the database name. Restored files are placed in that subdirectory. If the **/relocatedir** parameter is not specified, the files are restored into the directory where the **restorefiles** command is issued. For example, if Tivoli Storage

FlashCopy Manager is installed in the `c:\Program Files\Tivoli\TSM\`
`TDPSQLC` directory and the following command is issued from `E:\Somedir`:

```
e:\Somedir> c:\"Program Files"\Tivoli\TSM\TDPSQLC\tdpsqlc restorefiles
db1 full
```

then the files are restored to the subdirectories in the `e:\Somedir` location:

```
e:\Somedir\db1\db1.mdf
e:\Somedir\db1\db1.ldf
```

/TSMNODe=_tsmnodename_

Use the _tsmnodename_ variable to refer to the Tivoli Storage Manager node
name that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli
Storage Manager. You can store the node name in the Tivoli Storage
Manager options file (dsm.opt). This parameter overrides the value in the
Tivoli Storage Manager options file if **PASSWORDACCESS** is set to PROMPT. This
parameter is not valid when **PASSWORDACCESS** is set to GENERATE in the
options file.

/TSMOPTFile=_tsmoptfilename_

Use the _tsmoptfilename_ variable to identify the Tivoli Storage FlashCopy
Manager options file.

The file name can include a fully qualified path name. If no path is
specified, the directory where Tivoli Storage FlashCopy Manager is
installed is searched.

If the _tsmoptfilename_ variable includes spaces, enclose the entire
/tsmoptfile parameter entry in double quotation marks. For example:

```
/TSMOPTFile="c:\Program Files\file.opt"
```

The default is `dsm.opt`.

/TSMPassword=_tsmpassword_

Use the _tsmpassword_ variable to refer to the Tivoli Storage Manager
password that Tivoli Storage FlashCopy Manager uses to log on to the
Tivoli Storage Manager. If you specified PASSWORDACCESS GENERATE in the
Tivoli Storage FlashCopy Manager options file (`dsm.opt`), supplying the
password is not necessary here because the one that is stored in the
registry is used. However, to store the password in the registry, you must
specify the Tivoli Storage Manager password the first time Tivoli Storage
FlashCopy Manager connects to the Tivoli Storage Manager.

If you do specify a password with this parameter when PASSWORDACCESS
GENERATE is in effect, the command-line value is ignored unless the
password for this node is not yet stored in the registry. In that case, the
specified password is stored in the registry and used when you run this
command.

If PASSWORDACCESS PROMPT is in effect, and you do not specify a password
value on the command line, then you are prompted for a password.

The Tivoli Storage Manager password that Tivoli Storage FlashCopy
Manager uses to log on to the Tivoli Storage Manager can be up to 63
characters in length.

Restorefiles examples

This output example provides a sample of the text, messages, and process status that displays when you use the **restorefiles** command.

This command, tdpsqlc restorefiles Finance FULL /backupdestination=local /RELOCATEDir=e:\test /FROMSQLServer=sqlsrv12, restores VSS files from a FULL type backup of the *Finance* database from the SQL Server named *sqlsrv12* into the e:\test directory. The restored files are displayed:

```
e:\test\Finance\finance.mdf
e:\test\Finance\finance_log.ldf
```

Set command

Use the **set** command to set the Tivoli Storage FlashCopy Manager for SQL Server configuration parameters that are defined in the Tivoli Storage FlashCopy Manager for SQL Server configuration file, tdpsql.cfg by default.

Use the **set** command to change the values for the Tivoli Storage FlashCopy Manager configurable parameters and options. The values are saved in a configuration file. The default file is tdpsql.cfg. Configuration values can also be set from the **Edit** menu in the GUI.

Note: If a configuration file is not specified, the tdpsql.cfg values are used, and a default configuration file is created with just the *lastprunedate* value. If an invalid or non-existent file is specified, the default values are used.

Set syntax

Use the **set** command syntax diagrams as a reference to view available options and truncation requirements.

TDPSQLC command

```
►►─TDPSQLC─Set─┬─ALWAYSONnode=─┬─[Windows Cluster Name]─┬─────────────────►◄
               │               └─nodename───────────────┘
               ├─DATEformat=─dateformatnum───────────────────
               ├─FROMSQLserver=─fromsqlserver───────────────
               │                                    ┌─No──┐
               ├─IMPORTVSSSNAPSHOTSONLYWhenneeded=[─┼─────┼─
               │                                    └─Yes─┘
               ├─LANGuage=─language─────────────────────────
               ├─LOCALDSMAGENTNODE=─nodename────────────────
               ├─LOGFile=─logfilename───────────────────────
               ├─LOGPrune=─┬─numdays─┬──────────────────────
               │           └─No──────┘
               ├─NUMBERformat=─numberformatnum──────────────
               ├─SQLAUTHentication=─┬─INTegrated─┬───────────
               │                    └─SQLuserid──┘
               │              ┌─=No──┐
               ├─/SQLCHECKSum─┼──────┼───────────────────────
               │              └─=Yes─┘
               │               ┌─=No──┐
               ├─/SQLCOMPression─┼──────┼────────────────────
               │               └─=Yes─┘
               ├─SQLSERVer=─sqlprotocol:sqlservername───────
               └─TIMEformat=─timeformatnum──────────────────
```

```
►►──────┬─────────────────────────────────────────────────────────────►◄
        │                    ┌─tdpsql.cfg─┐
        └─/CONFIGfile=───────┼────────────┤
                             └─configfilename─┘
```
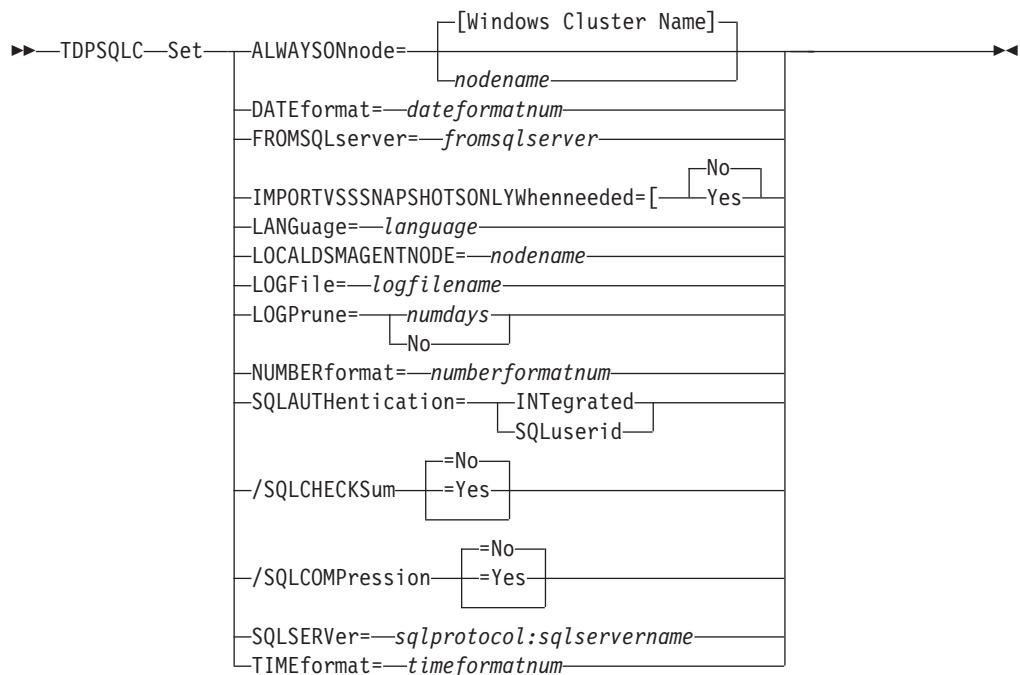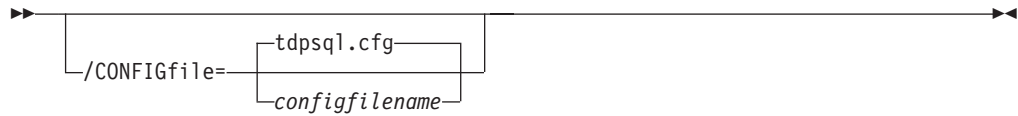
Set positional parameters

Positional parameters immediately follow the **set** command and precede the optional parameters.

To set default values in the Tivoli Storage FlashCopy Manager configuration file, specify one of the following when you issue a **set** command.

ALWAYSONNode=*nodename*

Specify the Tivoli Storage Manager node name that is used to back up AlwasyOn availability databases with SQL Server 2012 and later versions. This parameter is required when you are configuring Tivoli Storage FlashCopy Managerwith SQL Server 2012 and later versions. All availability databases in an availability group are backed up under this node name, regardless of which availability replica they are from. The databases that are not in an availability group are backed up under the standard Tivoli Storage FlashCopy Manager node name unless you specify the **USEALWAYSONnode** parameter.

DATEformat=*dateformatnum*

The **DATEformat** parameter selects the format that you want to use to display dates.

The *dateformatnum* variable can range 1 - 7. The initial value is 1. The number values specify the following formats:

1 MM/DD/YYYY.

2 DD-MM-YYYY.

3 YYYY-MM-DD.

4 DD.MM.YYYY.

5 YYYY.MM.DD.

6 YYYY/MM/DD.

7 DD/MM/YYYY.

Changes to the value of the **dateformat** parameter can result in an undesired pruning of the Tivoli Storage FlashCopy Manager log file (tdpsql.log by default). You can avoid losing existing log file data by running one of the following tasks:

- After you change the value of the **dateformat** parameter, make a copy of the existing log file before you run Tivoli Storage FlashCopy Manager.
- Specify a new log file with the **/logfile** parameter.

FROMSQLSERVer=*sqlservername*

The **fromsqlserver** parameter specifies the SQL Server that backup objects were backed up from. This parameter is necessary only when the name of the SQL Server to restore to, as determined by the **sqlserver** parameter, is different from the name of the SQL Server that the backup objects were created from. Use **fromsqlserver** for **query FCM**, but use **sqlserver** for

query SQL commands. The default value is the *sqlserver* value or the value that is set in the Tivoli Storage FlashCopy Manager configuration file.

LANGuage=*language*
> Specify the three-character code of the language you want to use to display messages:

> **CHS** Simplified Chinese

> **CHT** Traditional Chinese

> **DEU** Standard German

> **ENU** American English (This setting is the default.)

> **ESP** Standard Spanish

> **FRA** Standard French

> **ITA** Standard Italian

> **JPN** Japanese

> **KOR** Korean

> **PTB** Brazilian Portuguese

IMPORTVSSSNAPSHOTSONLYWhenneeded=Yes | No
> By default, the parameter is set to No. This default setting means that local persistent VSS snapshots are automatically imported to the Windows system where the snapshots are created. By importing the VSS snapshots only when needed, the snapshots are imported to a host for FlashCopy Manager operations. To not automatically import local persistent snapshots to the Windows system where the snapshots are created, set the parameter to Yes.

LOCALDSMAgentnode=*nodename*
> Specify the node name of the local system that runs the VSS backups. This positional parameter must be specified for VSS operations to be done.

LOGFile=*logfilename*
> The **logfile** parameter specifies the name of the activity log that is generated by Tivoli Storage FlashCopy Manager. The activity log records significant events such as completed commands and error messages. This log is distinct from the SQL Server error log. The *logfilename* variable identifies the name to be used for the activity log generated by Tivoli Storage FlashCopy Manager.

> Considerations:
> * If the specified file does not exist, it is created. If it does exist, new log entries are appended to the file.
> * The file name can include a fully qualified path; however, if you specify no path, the file is written to the directory where Tivoli Storage FlashCopy Manager is installed.
> * You cannot turn Tivoli Storage FlashCopy Manager logging activity off. If you do not specify **/logfile**, log records are written to the default log file. The default log file is tdpsql.log.

/LOGPrune=*numdays***|No**

> When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days

of data are saved. By default, *60* days of log entries are saved. The option `No` can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:

- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
- If you specify `no`, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  – Make a copy of the existing log file.
  – Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

NUMBERformat=*numberformatnum*

The **numberformat** parameter specifies the format of the numbers that are displayed by Tivoli Storage FlashCopy Manager. The *numberformatnum* variable can range 1 - 6. The initial value is 1. The number values specify the following formats:

1	1,000.00
2	1,000,00
3	1 000,00
4	1 000.00
5	1.000,00
6	1'000,00

SQLAUTHentication=INTegrated | SQLuserid

This parameter specifies the authorization mode that is used when you log on to the SQL Server. The `integrated` value specifies Windows authentication. The user ID that you use to log on to Windows is the same ID you use to log on to the SQL Server. This option is the default value. Use the `sqluserid` value to specify SQL Server user ID authorization. The user ID specified by the `sqluserid` parameter is the ID you use to log on to the SQL Server. That user ID must have the SQL Server SYSADMIN fixed server role.

SQLSERVer=*sqlprotocol:sqlservername*

The **SQLSERVersqlserver** parameter specifies the SQL Server that Tivoli Storage FlashCopy Manager logs on to. This SQL Server is the one that backup objects are restored to. However, if the backup objects were created from a different SQL Server name, you must use the **fromsqlserver**

parameter. Use **sqlserver** for the **query SQL** command. The *sqlprotocol* variable specifies the communication protocol to use. You can specify one of the following protocols:

- *lpc*: Use Shared Memory protocol.
- *np*: Use Named Pipes protocol.
- *tcp*: Use Transmission Control protocol.
- *via*: Use Virtual Interface Architecture protocol.

If no protocol is specified, Tivoli Storage FlashCopy Manager logs on to the SQL Server according to the first protocol that becomes available.

TIMEformat=*timeformatnum*

The **timeformat** parameter specifies the format of the times that are displayed by Tivoli Storage FlashCopy Manager. The *timeformatnum* variable can range 1 - 4. The initial value is 1. The number values specify the following formats:

1	23:00:00
2	23,00,00
3	23.00.00
4	11:00:00A/P

Changes to the value of the **timeformat** parameter can result in an undesired pruning of the Tivoli Storage FlashCopy Manager log file (tdpsql.log by default). You can avoid losing existing log file data by doing one of the following choices:

- After you change the value of the **timeformat** parameter, make a copy of the existing log file before you run Tivoli Storage FlashCopy Manager.
- Specify a new log file with the **/logfile** parameter.

USEALWAYSONnode

Specify this parameter to back up standard databases on SQL Server 2012 and later versions by using the AlwaysOn node. By setting this parameter, you can back up all availability databases and standard databases under a single node to help you to manage your database backups more easily. By default, SQL Server 2012 and later version availability databases are backed up to the AlwaysOn node.

Set optional parameters

Optional parameters follow the **set** command and positional parameters.

/CONFIGfile=*configfilename*

The **/configfile** parameter specifies the name of the Tivoli Storage FlashCopy Manager configuration file, which contains the values for the Tivoli Storage FlashCopy Manager configurable options.

Considerations:

- *configfilename* can include a fully qualified path. If *configfilename* does not include a path, it uses the directory where Tivoli Storage FlashCopy Manager is installed.
- If *configfilename* includes spaces, place it in double quotation marks.
- If you do not specify **/configfile**, the default value is tdpsql.cfg.
- If you specify **/configfile** but not *configfilename*, the default value tdpsql.cfg is used.

SQLCHECKSum=Yes | No

> The **SQLCHECKSum** parameter specifies whether SQL checksum processing is set for all legacy database backups. If you do not specify a value of **Yes** for this parameter, the value that is specified in the `tdpsql.cfg` file is used. If no value is specified in the `tdpsql.cfg` file, the default value of No is used.
>
> The **SQLCHECKSum** parameter is only available with legacy backups.

/SQLCOMPression=Yes | No

> The **/sqlcompression** parameter specifies whether SQL compression is applied. If you do not specify **/sqlcompression**, the default value No is used.
>
> This parameter is only applicable on systems that run SQL Server 2008 or later versions. For SQL Server 2008, backup compression is only supported on Enterprise Edition. For SQL Server 2008 R2, backup compression is supported on Standard, Enterprise, and Datacenter editions.

Set output example

These output examples provide a sample of the text, messages, and process status that displays when you use the **set** command.

The following specifies the *mutalisk* server as the default SQL server in the configuration file.

Command:

> tdpsqlc set sqlserver=mutalisk

Output:

> FMY5054I The configuration option was set successfully.

Unmount Backup command

> Use the **unmount backup** command to unmount backups that are previously mounted, and are managed by Tivoli Storage FlashCopy Manager for SQL Server.

Unmount Backup syntax

> Use the **unmount backup** command syntax diagrams as a reference to view available options and truncation requirements.

TDPSQLC command

```
►►──TDPSQLC──UNMOUNT BACKup────mount point root directory──────────────────►

 ┌─────────────────────────────────────────────────────────────────────────┐
►────┬──────────────────────────────────┬──┬──────────────────────────┬─────►
     │              ┌─tdpsql.xml─┐       │  │           ┌─tdpsql.log─┐  │
     └─/CONFIGfile=──┼────────────┼──────┘  └─/LOGFile=──┼────────────┼──┘
                     └─configfilename─┘                   └─logfilename─┘

        ┌─60──────┐
►──/LOGPrune=──┼─numdays─┼──────────────────────────────────────────────────►
        └─No──────┘   └─/QUERYNode──┬─=DP───────┬─
                                    ├─=ALWAYSON─┤
                                    └─=BOTH─────┘
```

```
├──┬─────────────────────────────────┬──┬───────────────────────────┬──┤
   └─/REMOTECOMPUTER=─computername─┘  └─/REMOTECOMPUTERUser=─user─┘

├──┬────────────────────────────────────┬──┬──────────────────────────┬──┤
   └─/REMOTECOMPUTERPassword=─passwd─┘     └─/TSMNODe=─tsmnodename─┘

├──┬──────────────────┬─────────────────────┬──┬──────────────────────────────┬──┤
   └─/TSMOPTFile=──┬─dsm.opt──────────┬─┘     └─/TSMPassword=─tsmpassword─┘
                   └─tsmoptfilename─┘
```
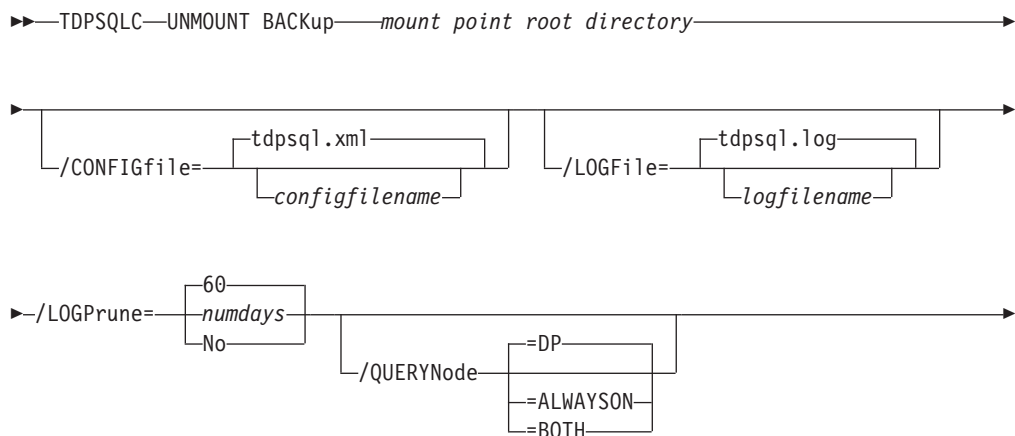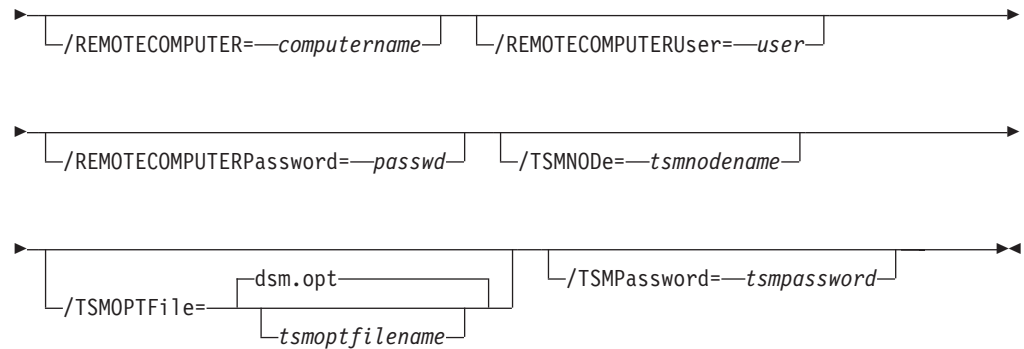
Unmount Backup positional parameter

The positional parameter immediately follows the **unmount backup** command and precedes the optional parameters.

mount points root directory

Unmount Backup optional parameters

Optional parameters follow the **unmount backup** command and positional parameters.

/CONFIGfile=*configfilename*

Use the **/configfile** parameter to specify the name (*configfilename*) of the configuration file that contains the values to use for an **unmount backup** operation.

The *configfilename* variable can include a fully qualified path. If the *configfilename* variable does not include a path, the installation directory is used. If the **/configfile** parameter is not specified, or if the *configfilename* variable is not specified, the default value is tdpsql.cfg.

If the *configfilename* variable includes spaces, enclose the entire **/configfile** parameter entry in double quotation marks. For example:

/CONFIGfile="c:\Program Files\tdpsql.cfg"

/LOGFile=*logfilename*

Use the **/logfile** parameter to specify the name of the activity log file. The *logfilename* variable identifies the name of the activity log file.

If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *logfilename* variable can include a fully qualified path. However, if no path is specified, the log file is written to the installation directory.

If the *logfilename* variable includes spaces, enclose the entire **/logfile** parameter entry in double quotation marks. For example:

/LOGFile="c:\Program Files\tdpsql.log"

If the **/logfile** parameter is not specified, log records are written to the default log file, tdpsql.log.

The **/logfile** parameter cannot be turned off, logging always occurs.

/LOGPrune=*numdays***|No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days

of data are saved. By default, *60* days of log entries are saved. The option `No` can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:
- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
- If you specify `no`, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/QUERYNode=DP | ALWAYSON | BOTH
Specify whether you want to query standard databases from SQL Server 2012 and later database versions that were backed up from a standard Data Protection for SQL Server node, the AlwaysOn node, or both nodes. This parameter is ignored for availability databases because the availability databases are always backed up under the AlwaysOn node.

/REMOTECOMPUTER=computername
Enter the IP address or host name for the remote system where you want to unmount the data.

/REMOTECOMPUTERUser=user
Enter the user name that is used to log on to the server specified with the **REMOTECOMPUTER** parameter. If a domain is required to log on with the domain account, enter *Domain\User*. To log on to the local account, the domain is not required. There is no default value.

/REMOTECOMPUTERPassword=passwd
Enter the password for the user name that is specified with the **REMOTECOMPUTERUser** parameter. There is no default value.

/TSMNODe=tsmnodename
Use the *tsmnodename* variable to refer to the Tivoli Storage Manager node name that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

You can store the node name in the Tivoli Storage Manager options file (dsm.opt). This parameter overrides the value in the Tivoli Storage Manager options file if **PASSWORDACCESS** is set to PROMPT. This parameter is not valid when **PASSWORDACCESS** is set to GENERATE in the options file.

/TSMOPTFile=*tsmoptfilename*

>Use the *tsmoptfilename* variable to identify the Tivoli Storage Manager options file.
>
>The file name can include a fully qualified path name. If no path is specified, the directory where Tivoli Storage FlashCopy Manager is installed is searched.
>
>If the *tsmoptfilename* variable includes spaces, enclose the entire **/tsmoptfile** parameter entry in double quotation marks. For example:
>
>/TSMOPTFile="c:\Program Files\dsm.opt"
>
>The default is dsm.opt.

/TSMPassword=*tsmpassword*

>Use the *tsmpassword* variable to refer to the Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.
>
>If you specified PASSWORDACCESS GENERATE in the Tivoli Storage FlashCopy Manager options file (dsm.opt), supplying the password is not necessary here because the one that is stored in the registry is used. However, to store the password in the registry, you must specify the Tivoli Storage Manager password the first time Tivoli Storage FlashCopy Manager connects to the Tivoli Storage Manager server.
>
>If you do specify a password with this parameter when PASSWORDACCESS GENERATE is in effect, the command-line value is ignored unless the password for this node is not yet stored in the registry. In that case, the specified password is stored in the registry and used when you run this command.
>
>If PASSWORDACCESS PROMPT is in effect, and you do not specify a password value on the command line, then you are prompted for a password.
>
>The Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Unmount backup example

An example of how to use the **UNMOUNT BACKup** command is provided.

TDPSQLC UNMOUNT BACKup K:\MP-dir

Tivoli Storage FlashCopy Manager commands for custom applications and file systems

The name of the Tivoli Storage FlashCopy Manager for custom applications and file systems command-line interface is **fcmcli.exe**. By default, this program is in the Tivoli Storage FlashCopy Manager installation directory (C:\Program Files\Tivoli\FlashCopyManager\).

Command-line parameter characteristics

Review these parameter characteristics before you attempt a command-line operation.

- Positional parameters do not include a leading slash (/) or dash (-)
- Optional parameters can display in any order after the required parameters
- Optional parameters begin with a forward slash (/) or a dash (-)

- Minimum abbreviations for keywords are indicated in uppercase text
- Some keyword parameters require a value
- For those keyword parameters that require a value, the value is separated from the keyword with an equal sign (=)
- If a parameter requires more than one value after the equal sign, the values are separated with commas
- Each parameter is separated from the others by using spaces
- If a parameter's value includes spaces, the value must be enclosed in double quotation marks
- A positional parameter can display only one time per command invocation

For help in reading syntax diagrams, see "Reading syntax diagrams" on page xii.

Command-line interface help

Issue the `fcmcli ?` or `fcmcli help` command to display help for the command-line interface.

Related tasks:

"Protecting custom application and file system data" on page 193

Backup command

Use the **backup** command to create a VSS snapshot backup of volumes and mount points to local shadow volumes.

The VSS snapshot is managed by Tivoli Storage FlashCopy Manager or Tivoli Storage Manager.

Backup syntax

Use the **backup** command syntax diagrams as a reference to view available options and truncation requirements.

FCMCLI command

```
►►─FCMCLI─BACKup──component name list────────────────────────────────────►
                                        └─/CONFIGfile=─┬─fcmcfg.xml─┬─┘
                                                       └─filename─┘
```

```
►───────────────────────────────────────────────────────────────────────►
   └─/FCMOPTFile=─┬─dsm.opt──┬─┘
                  └─filename─┘
```

```
►───────────────────────────────────────────────────────────────────────►
   └─/LOGFile─┬─=fcm.log [or cfg value]─┬─┘
              └─=logfilename────────────┘
```

```
►───────────────────────────────────────────────────────────────────────►
   └─/LOGPrune=─┬─60 [or cfg value]─┬─┘ └─/OFFLOAD─┘
               ├─numdays────────────┤
               └─No─────────────────┘
```

```
                 └─/PRESNapshotcmd=──cmdstring─┘   └─/POSTSNapshotcmd=──cmdstring─┘



                 └─/TSMNODe=──nodename─┘  └─/TSMPassword=──password─┘
```
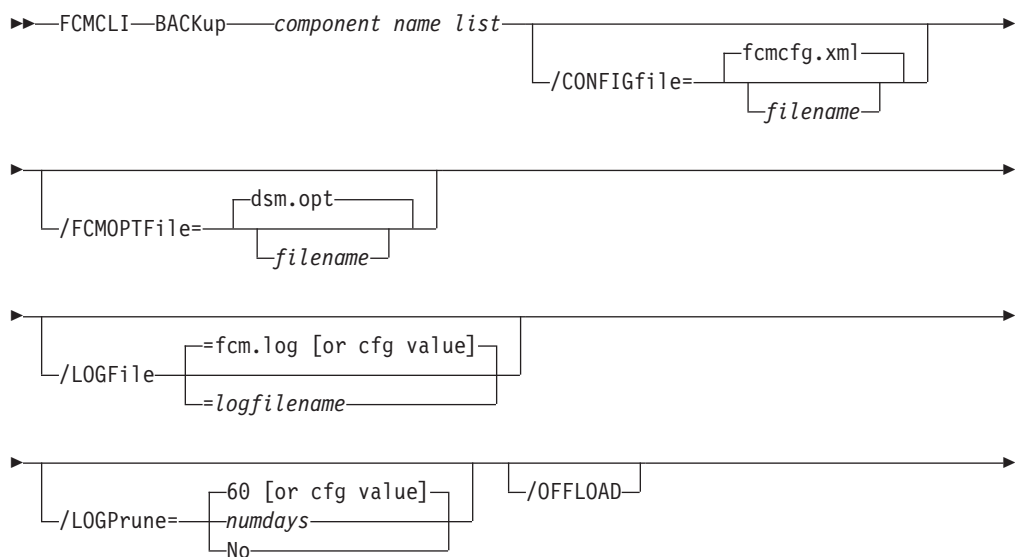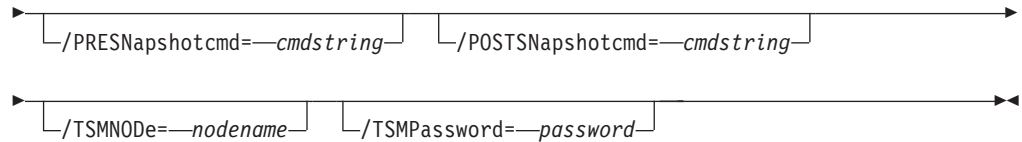
Backup positional parameter

The positional parameter immediately follows the **backup** command and precedes the optional parameters.

Specify the following positional parameter with the **backup** command:

component name list
> Specify a list, of volume or mount points that are separated by commas to back up.

Backup optional parameters

Optional parameters follow the **backup** command and positional parameters.

/CONFIGfile=*filename*
> Use the **/CONFIGfile** parameter to specify the name (*filename*) of the Tivoli Storage FlashCopy Manager configuration file that contains the values to use for a **backup** operation.
>
> The *filename* variable can include a fully qualified path. If the *filename* variable does not include a path, the Tivoli Storage FlashCopy Manager installation directory is used. If the **/configfile** parameter is not specified, or if the *filename* variable is not specified, the default value is fcmcfg.xml.
>
> If the *filename* variable includes spaces, enclose the entire **/CONFIGfile** parameter entry in double quotation marks. For example:
>
> /CONFIGfile="c:\Program Files\fcmcfg.xml"

/FCMOPTFile=*filename*
> Use the *filename* variable to identify the Tivoli Storage Manager options file.
>
> The file name can include a fully qualified path name. If no path is specified, the directory where Tivoli Storage FlashCopy Manager is installed is searched.
>
> If the *filename* variable includes spaces, enclose the entire **/FCMOPTFile** parameter entry in double quotation marks. For example:
>
> /FCMOPTFile="c:\Program Files\file.opt"
>
> The default is dsm.opt.

/LOGFile=*filename*
> Use the **/LOGFile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager. The *filename* variable identifies the name of the activity log file.
>
> If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *filename* variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager installation directory.
>
> If the *filename* variable includes spaces, enclose the entire **/LOGFile** parameter entry in double quotation marks. For example:

```
/LOGFile="c:\Program Files\myfcm.log"
```

If the **/LOGFile** parameter is not specified, log records are written to the default log file, `fcm.log`.

The **/LOGFile** parameter cannot be turned off, logging always occurs.

/LOGPrune=*numdays* | **No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, *60* days of log entries are saved. The option `No` can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:

- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
- If you specify `no`, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/OFFLOAD

Specify this option if, after the VSS snapshot is complete, you want to offload the transfer of the data from the Tivoli Storage Manager server to the system specified by the **REMOTEDSMAGENTNODE** parameter. This option is only valid when the **BACKUPDESTination** parameter is set to either TSM or BOTH. The default is to not offload data.

/PRESNapshotcmd=*cmdstring*

The **/PRESNapshotcmd** parameter runs a command or script before a snapshot operation begins. You can use this optional parameter to quiesce an application before a snapshot is created. You can then restart the application after the snapshot is started by using the **/POSTSNapshotcmd** optional parameter. The *cmdstring* variable specifies the command to run before the snapshot operation begins. You must specify the fully qualified path name for the command script.

/POSTSNapshotcmd=*cmdstring*

The **/POSTSNapshotcmd** parameter runs a command or script after a snapshot operation ends. You can use this optional parameter to resume

the application after the snapshot is created. This parameter is used with the **/PRESNapshotcmd** parameter. The *cmdstring* variable must be a fully qualified path.

/TSMNODe=*nodename*

Use the *nodename* variable to refer to the Tivoli Storage Manager node name that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

You can store the node name in the Tivoli Storage Manager options file (dsm.opt). This parameter overrides the value in the Tivoli Storage Manager options file if **PASSWORDACCESS** is set to PROMPT. This parameter is not valid when **PASSWORDACCESS** is set to GENERATE in the options file.

/TSMPassword=*password*

Use the *password* variable to refer to the Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

If you specified PASSWORDACCESS GENERATE in the Tivoli Storage FlashCopy Manager options file (dsm.opt), supplying the password is not necessary here because the one that is stored in the registry is used. However, to store the password in the registry, you must specify the Tivoli Storage Manager password the first time Tivoli Storage FlashCopy Manager connects to the Tivoli Storage Manager server.

If you do specify a password with this parameter when PASSWORDACCESS GENERATE is in effect, the command-line value is ignored unless the password for this node is not yet stored in the registry. In that case, the specified password is stored in the registry and used when you run this command.

If PASSWORDACCESS PROMPT is in effect, and you do not specify a password value on the command line, then you are prompted for a password.

The Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Backup examples

These output examples provide a sample of the text, messages, and process status that displays when you use the **backup** command.

In this example, the `backup c:,d:` command is run from the Automate tab integrated command line.

The following output is displayed:

```
Preparing for a BACKUP operation, please wait...

Connecting to FCM Server as node 'MALTA_FS'...
Connecting to Local DSM Agent 'MALTA'...
Starting component backup...

Beginning VSS backup of 'C:', 'D:'...

VSS Backup operation completed with rc = 0.

  Elapsed Processing Time: 118.52 seconds
Completed
```

In this example, the backup c:,d: /PRESNapshotcmd="STOPDB.CMD"
/POSTSNapshotcmd="STARTDB.CMD" is run from the Automate integrated command
line. The following output is displayed:

```
C:\Program Files\Tivoli\FlashCopyManager>fcmcli back c:,d:
/presn="C:\Program Files\Tivoli\FlashCopyManager\stopdb.cmd"
/postsn="C:\Program Files\Tivoli\FlashCopyManager\startdb.cmd"

FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 4, Release 1, Level 2.0
(C) Copyright IBM Corporation 2009, 2015. All rights reserved.

Preparing for a BACKUP operation, please wait...

Connecting to FCM Server as node 'MALTA_FS'...
Connecting to Local DSM Agent 'MALTA'...
Starting component backup...

Beginning VSS backup of 'C:', 'D:'...


VSS Backup operation completed with rc = 0.

Elapsed Processing Time: 130.16 seconds
```

Delete backup command

Use the **delete backup** command to delete Tivoli Storage FlashCopy Manager
snapshot backups from local shadow volumes.

Delete backup syntax

Use the **delete backup** command syntax diagrams as a reference to view available
options and truncation requirements.

```
►►──FCMCLI──DELete BACKup── component name list ──────────────────────────►

►──┬────────────────────────────────┬──┬───────────────────────────┬──►
   │            ┌─fcmcfg.xml─┐       │  │            ┌─dsm.opt─┐     │
   └─/CONFIGfile=┴──────────┴────────┘  └─/FCMOPTFile=┴─────────┴────┘
                 └─filename─┘                         └─filename─┘


►──┬────────────────────────────────────┬──────────────────────────────►
   │            ┌─server name──────┐     │
   └─/FROMSERVer=┴──────────────────┴────┘
                 └─current server──┘


►──┬────────────────────────────────────────┬──────────────────────────►
   │          ┌─=fcm.log [or cfg value]─┐    │
   └─/LOGFile─┴─────────────────────────┴────┘
              └─=filename───────────────┘


►──┬───────────────────────────────────────────┬──┬──────────────────┬──►
   │           ┌─60 [or cfg value]─┐            │  │                  │
   └─/LOGPrune=┼─numdays───────────┼────────────┘  └─/TSMNODe=─nodename─┘
               └─No────────────────┘


►──┬───────────────────────────────┬──────────────────────────────────►◄
   └─/TSMPassword=─password─────────┘
```
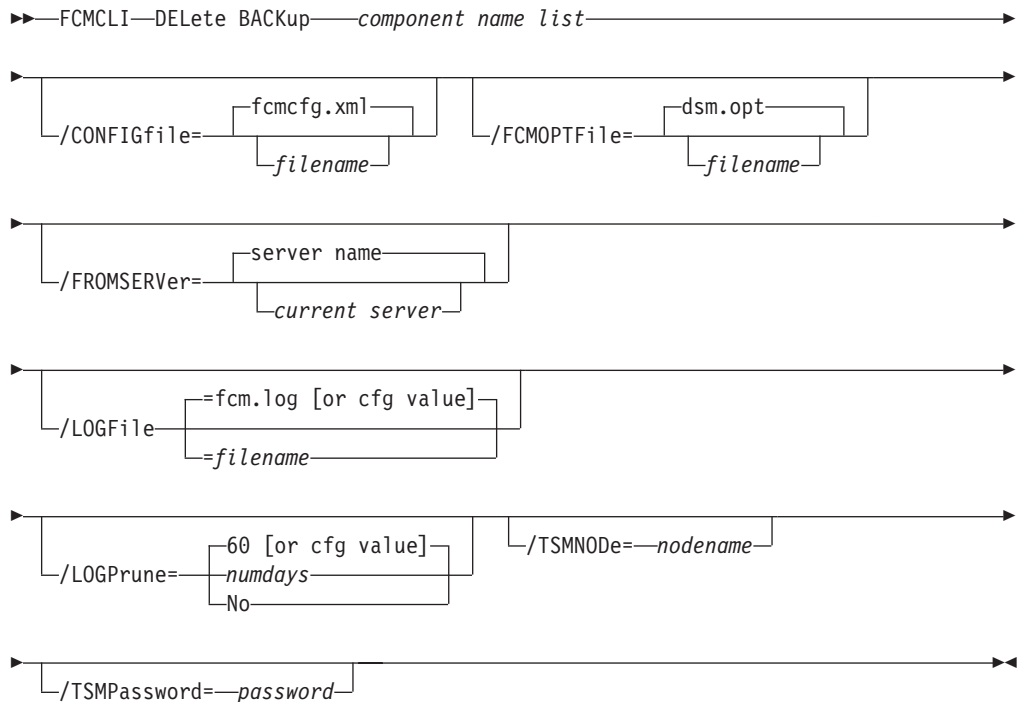
Delete backup positional parameter

The positional parameter immediately follows the **delete backup** command and precedes the optional parameters.

Specify the following positional parameter with the **delete backup** command:

component name list

Specify a list of volume or mount points to delete. The list must contain all non-qualified objects or all qualified objects. The list cannot contain a combination of non-qualified objects and qualified objects.

Specify the component name list by using the following syntax:

object-1[(*object-1-id*)][,*object-2*[(*object-2-id*)]...]

For example:

```
fcmcli delete backup g:(20110311124516),h:(20110211034512),r:(20101114164310)
```

The following example is for a non-qualified object `object-1`:

```
delete backup g:
```

The following example is for a qualified object `object-1 (object-1-id)`:

```
delete backup g:(20110815064316)
```

Use the **query backup** command to find the Object Name identifier.

```
Backups for Volume/Mount Point: 'D:'
==========================================================================
Volume/Mount Point      : D:
Volume GUID             : 3487bc7e-4465-11dc-81cc-001a640a19f2
Server                  : MALTA
Volume Occupancy        :     17.40GB
Backup Date/Time        : 08/30/2011 04:07:04
Backup State            : Active
Management Class         : DEFAULT
Mounted as              :
Object Name             : 20110830040704
Instant Restore Supported : No

Completed
```

Delete backup optional parameters

Optional parameters follow the **delete backup** command and positional parameter.

/CONFIGfile=*configfilename*

Use the **/configfile** parameter to specify the name (*configfilename*) of the Tivoli Storage FlashCopy Manager configuration file that contains the values to use for a **delete backup** operation.

The *configfilename* variable can include a fully qualified path. If the *configfilename* variable does not include a path, the Tivoli Storage FlashCopy Manager installation directory is used. If the **/configfile** parameter is not specified, or if the *configfilename* variable is not specified, the default value is fcmcfg.xml.

If the *configfilename* variable includes spaces, enclose the entire **/configfile** parameter entry in double quotation marks. For example:

/CONFIGfile="c:\Program Files\fcmcfg.xml"

/FCMOPTFile=*filename*

Use the *filename* variable to identify the Tivoli Storage Manager options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Tivoli Storage FlashCopy Manager is installed is searched.

If the *filename* variable includes spaces, enclose the entire **/FCMOPTFile** parameter entry in double quotation marks. For example:

```
/FCMOPTFile="c:\Program Files\file.opt"
```

The default is dsm.opt.

/FROMSERVer=*server-name*

Use the **/fromserver** parameter to specify the name of the server where the original backup was done. The default is the local server.

/LOGFile=*logfilename*

Use the **/LOGFile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager. The *logfilename* variable identifies the name of the activity log file.

If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *logfilename* variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager installation directory.

If the *logfilename* variable includes spaces, enclose the entire **/LOGFile** parameter entry in double quotation marks. For example:

```
/LOGFile="c:\Program Files\myfcm.log"
```

If the **/LOGFile** parameter is not specified, log records are written to the default log file, fcm.log.

The **/LOGFile** parameter cannot be turned off, logging always occurs.

/LOGPrune=*numdays*|**No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, *60* days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:
- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60.*
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.

- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/TSMNODe=*nodename*

Use the *nodename* variable to refer to the Tivoli Storage Manager node name that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

You can store the node name in the Tivoli Storage Manager options file (dsm.opt). This parameter overrides the value in the Tivoli Storage Manager options file if **PASSWORDACCESS** is set to PROMPT. This parameter is not valid when **PASSWORDACCESS** is set to GENERATE in the options file.

/TSMPassword=*password*

Use the *password* variable to refer to the Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

If you specified PASSWORDACCESS GENERATE in the Tivoli Storage FlashCopy Manager options file (dsm.opt), supplying the password is not necessary here because the one that is stored in the registry is used. However, to store the password in the registry, you must specify the Tivoli Storage Manager password the first time Tivoli Storage FlashCopy Manager connects to the Tivoli Storage Manager server.

If you do specify a password with this parameter when PASSWORDACCESS GENERATE is in effect, the command-line value is ignored unless the password for this node is not yet stored in the registry. In that case, the specified password is stored in the registry and used when you run this command.

If PASSWORDACCESS PROMPT is in effect, and you do not specify a password value on the command line, then you are prompted for a password.

The Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Delete backup example

This output example provides a sample of the text, messages, and process status that displays when you use the **delete backup** command.

In this example, the `fcmcli delete backup G:,H:` command deletes the backups of volumes G and H. The following output is displayed:

```
Backup(s) to be deleted:
  G: and H: : VSS : full : 03/12/2014 12:04:33
VSS Delete backup operation completed with rc = 0
   Files Examined    : 2
   Files Completed   : 2
   Files Failed      : 0
   Total Bytes       : 0
```

Help command

Use the `fcmcli help` command to display help for Tivoli Storage FlashCopy
Manager commands.

This command lists one or more commands and their parameters. For a language
other than English, you might be required to set the width of your screen display.
Choose a value greater than 80 characters to view the entire help description in a
screen. For example, set the screen width to 100 characters.

Help syntax

Use the `help` command syntax diagrams as a reference to view available options
and truncation requirements.

FCMCLI command

```
►►──FCMCLI──┬──────┬──┬────────────*─────────┬──┬───────────*────────────┬──►◄
            ├──?───┤  └──command──┘            └──subcommand──┘
            └─HELP─┘
```
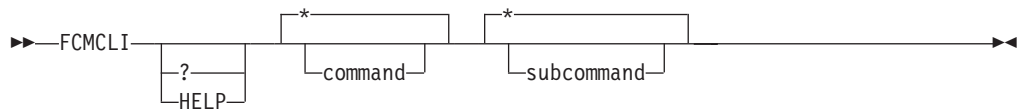
Help positional parameters

Positional parameters follow the Tivoli Storage FlashCopy Manager `help`
command.

The following positional parameters specify the help to be displayed:

* | *command*
> Identifies the specific Tivoli Storage FlashCopy Manager command that is
> to be displayed. If the wildcard character (∗) is used, help for all Tivoli
> Storage FlashCopy Manager commands is displayed.

* | *subcommand*
> Help can be displayed for commands that have several subcommands, for
> example, the `query components` command. If you do not specify a
> subcommand or the wildcard character (∗), help for all Tivoli Storage
> FlashCopy Manager `query components` commands is displayed.

Policy commands for Tivoli Storage FlashCopy Manager

Create Policy
> This command is used to create a policy.

> **FCMCLI command**
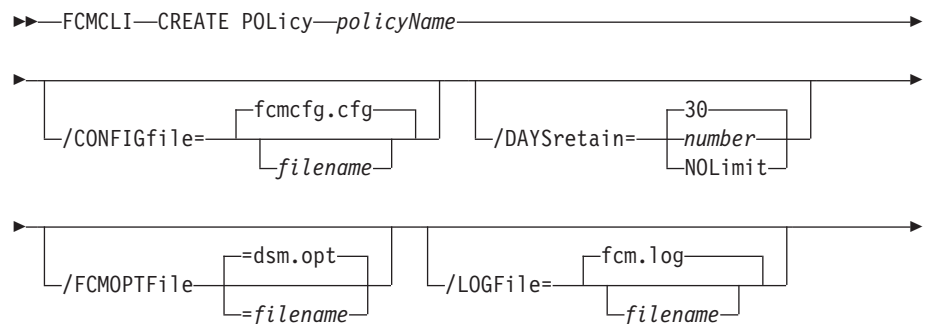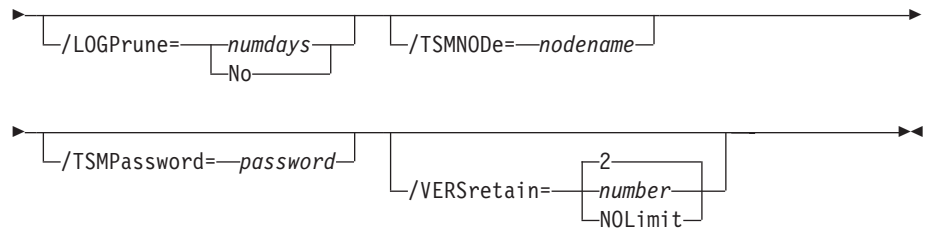
```
►►──FCMCLI──CREATE POLicy──policyName─────────────────────────────────────►

►──┬───────────────────────────────────┬──┬─────────────────────────┬─────►
   └─/CONFIGfile=─┬─fcmcfg.cfg─┬────────┘  └─/DAYSretain=─┬──30──────┬─┘
                  └─filename─┘                            ├─number───┤
                                                          └─NOLimit──┘

►──┬──────────────────────────────┬──┬────────────────────────┬───────────►
   └─/FCMOPTFile─┬─=dsm.opt───┬────┘  └─/LOGFile=─┬─fcm.log──┬──┘
                 └─=filename─┘                     └─filename─┘
```

```
       ┌─────────────────────────┐      ┌──────────────────────────┐
►──────┤                         ├──────┤                          ├──────►
       └─/LOGPrune=─┬─numdays─┬──┘      └─/TSMNODe=─nodename────────┘
                    └─No──────┘
```

```
       ┌──────────────────────────┐     ┌────────────────────────────────┐
►──────┤                          ├─────┤                                ├──◄
       └─/TSMPassword=─password────┘     │                 ┌─2──────┐     │
                                         └─/VERSretain=────┼─number─┼─────┘
                                                           └─NOLimit┘
```

Parameters:
- *policy_name* (required): Specifies the name of the policy that is being created. To create a policy, the policy name must be unique.
- **/DAYSretain**: Specifies the number of days to retain a snapshot (0 - 9999). You can also specify NOLimit to represent an unlimited number of days to retain snapshot versions.
- **/VERSretain**: Specifies the number of snapshot versions to retain (1 - 9999). You can also specify NOLimit to represent an unlimited number of snapshot versions to retain.

Copy Policy

This command is used to copy an existing policy to a new policy.

FCMCLI command
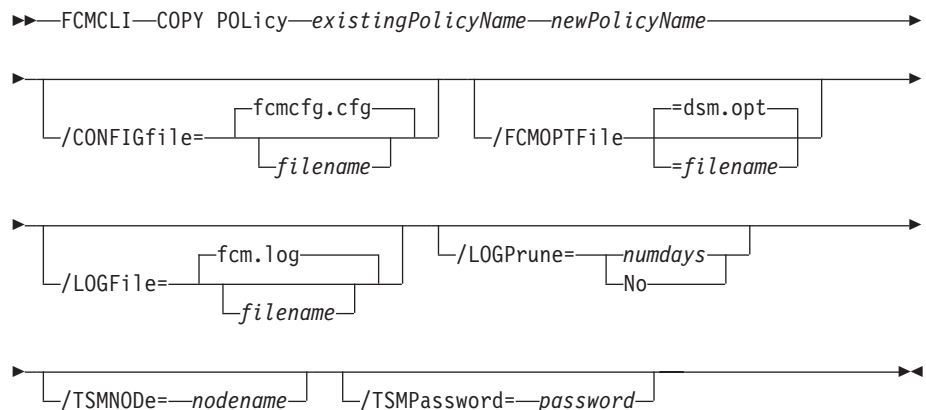
```
►►──FCMCLI──COPY POLicy─existingPolicyName─newPolicyName─────────────────►
```

```
       ┌───────────────────────────────┐   ┌────────────────────────────┐
►──────┤                               ├───┤                            ├──►
       │             ┌─fcmcfg.cfg─┐    │   │            ┌─=dsm.opt──┐    │
       └─/CONFIGfile=─┤            ├────┘   └─/FCMOPTFile┤           ├────┘
                      └─filename───┘                     └─=filename─┘
```

```
       ┌───────────────────────────┐   ┌──────────────────────────┐
►──────┤                           ├───┤                          ├────────►
       │          ┌─fcm.log──┐     │   │           ┌─numdays─┐     │
       └─/LOGFile=─┤          ├─────┘   └─/LOGPrune=─┤         ├────┘
                   └─filename─┘                      └─No──────┘
```

```
       ┌──────────────────────────┐   ┌───────────────────────────┐
►──────┤                          ├───┤                           ├─────────◄
       └─/TSMNODe=─nodename────────┘   └─/TSMPassword=─password─────┘
```

Parameters:
- *existing_policy_name* (required): Specifies the name of the policy that is being copied.
- *new_policy_name* (required): Specifies the name of the new policy. The policy name must be unique.

Query Policy

This command is used to list the attributes of a policy.

FCMCLI command

```
►►──FCMCLI──Query POLicy─policyName──────────────────────────────────────◄
```

For example:

```
c:\Program Files\Tivoli\FlashCopyManager>fcmcli q pol T1

FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
```

```
Version 4, Release 1, Level 2.0
(C) Copyright IBM Corporation 2009, 2015. All rights reserved.

Policy Definitions
================================================================

Policy Name                       : T1
Number of snapshots to keep       : No Limit
Number of days to retain snapshot : No Limit
```

Update Policy

This command is used to update or modify an existing policy.

FCMCLI command
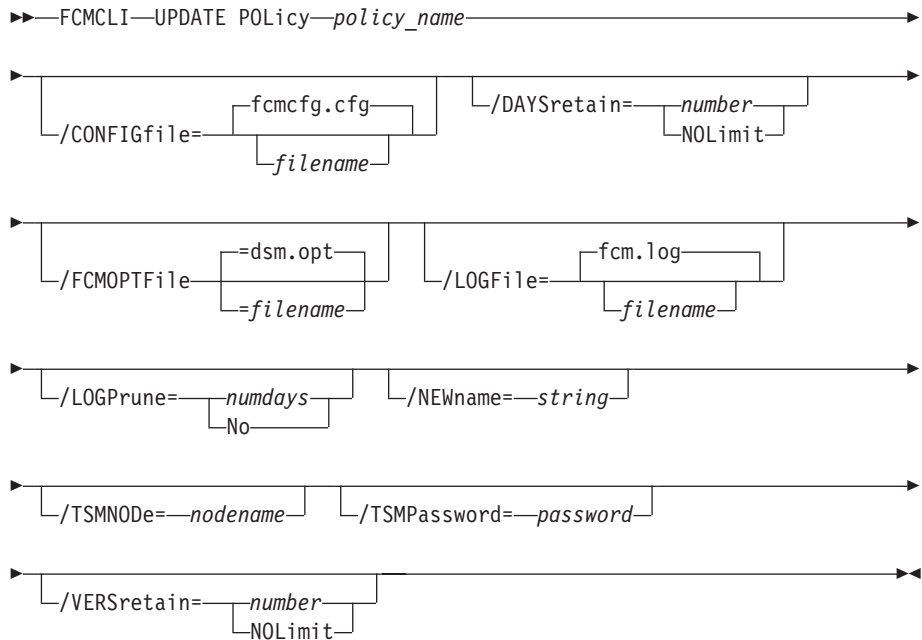
►►──FCMCLI──UPDATE POLicy──*policy_name*──────────────────────────────────►

►─┬─────────────────────────────────────┬──┬────────────────────────────┬─►
  └─/CONFIGfile=─┬─fcmcfg.cfg─┬──────────┘ └─/DAYSretain=─┬─*number*─┬───┘
                 └─*filename*─┘   └─NOLimit──┘

►─┬────────────────────────────────────┬──┬─────────────────────────────┬─►
  └─/FCMOPTFile─┬─=dsm.opt────┬─────────┘ └─/LOGFile=─┬─fcm.log────┬─────┘
               └─=*filename*──┘   └─*filename*─┘

►─┬──────────────────────────────┬──┬──────────────────────┬──────────────►
  └─/LOGPrune=─┬─*numdays*─┬──────┘ └─/NEWname=──*string*──┘
              └─No─────────┘

►─┬──────────────────────────┬──┬───────────────────────────┬─────────────►
  └─/TSMNODe=──*nodename*─────┘ └─/TSMPassword=──*password*──┘

►─┬────────────────────────────────┬──────────────────────────────────────►◄
  └─/VERSretain=─┬─*number*─┬───────┘
               └─NOLimit────┘

Parameters:

- **NEWname**: Specifies the new name of the policy, if the name is being updated. The policy name must be unique.
- *policy_name* (required): Specifies the name of the policy that is being updated.
- **VERSretain**: Specifies the number of snapshot versions to retain (1 - 9999). You can also specify NOLimit to represent an unlimited number of snapshot versions to retain.
- **DAYSretain**: Specifies the number of days to retain a snapshot (0 - 9999). You can also specify NOLimit to represent an unlimited number of days to retain snapshot versions.

Delete Policy

This command is used to delete a policy.

FCMCLI command

►►──FCMCLI──DELete POLicy──*policy_name*──────────────────────────────────►

```
                 ┌─fcmcfg.cfg─┐                        ┌─=dsm.opt─┐
►──┬─────────────────────────────────────┬──┬──────────────────────────────┬──►
   └─/CONFIGfile=─┼────────────┤ │        └─/FCMOPTFile─┼────────────┤
                  └─filename─┘                          └─=filename─┘


                ┌─fcm.log──┐
►──┬──────────────────────────────┬──┬─/LOGPrune=─┬─numdays─┬──┬──►
   └─/LOGFile=─┼────────────┤               └─No──────┘
              └─filename─┘


►──┬─────────────────────────┬──┬───────────────────────────┬──►◄
   └─/TSMNODe=─nodename─┘        └─/TSMPassword=─password─┘
```
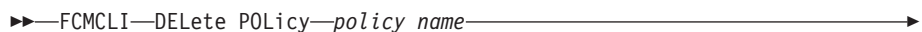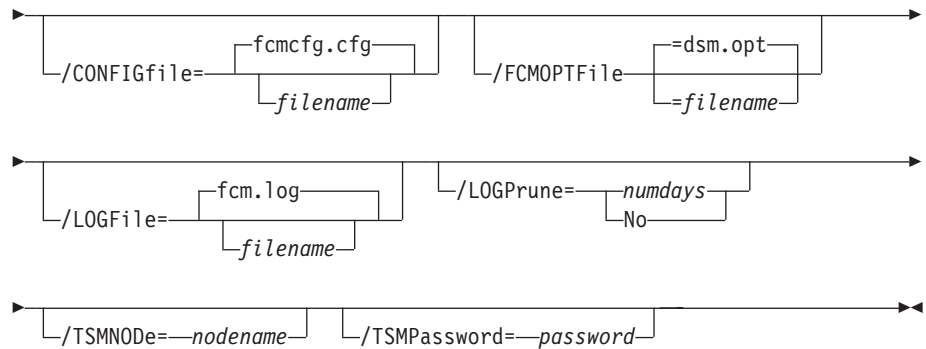
The required parameter is *policy_name*. The parameter specifies the name of
the policy that is being deleted.

Tivoli Storage FlashCopy Manager policy examples

These output examples provide a sample of the text, messages, and process status
that displays when you use the **create policy** and **delete policy** commands.

In this example, the `fcmcli create policy` FCMPOL1 command creates the
FCMPOL1 policy. The following output is displayed:

```
Policy 'FCMPOL1' was created.

The operation completed successfully. (rc = 0)

Completed
```

In this example, the `fcmcli delete policy` FCMPOL1 command deletes the
FCMPOL1 policy. The following output is displayed:

```
Policy 'FCMPOL1' was deleted.

The operation completed successfully. (rc = 0)

Completed
```

Mount backup command

Use the **mount backup** command to mount backups that are managed by Tivoli
Storage FlashCopy Manager or Tivoli Storage Manager.

Mount backup syntax

Use the **mount backup** command syntax diagrams as a reference to view available
options and truncation requirements.

FCMCLI command

```
►►──FCMCLI──────────────────────────────────────────────────────────►

►──MOUNT BACKup────component name=mount point──[,──component name=mount point──]──────►
```
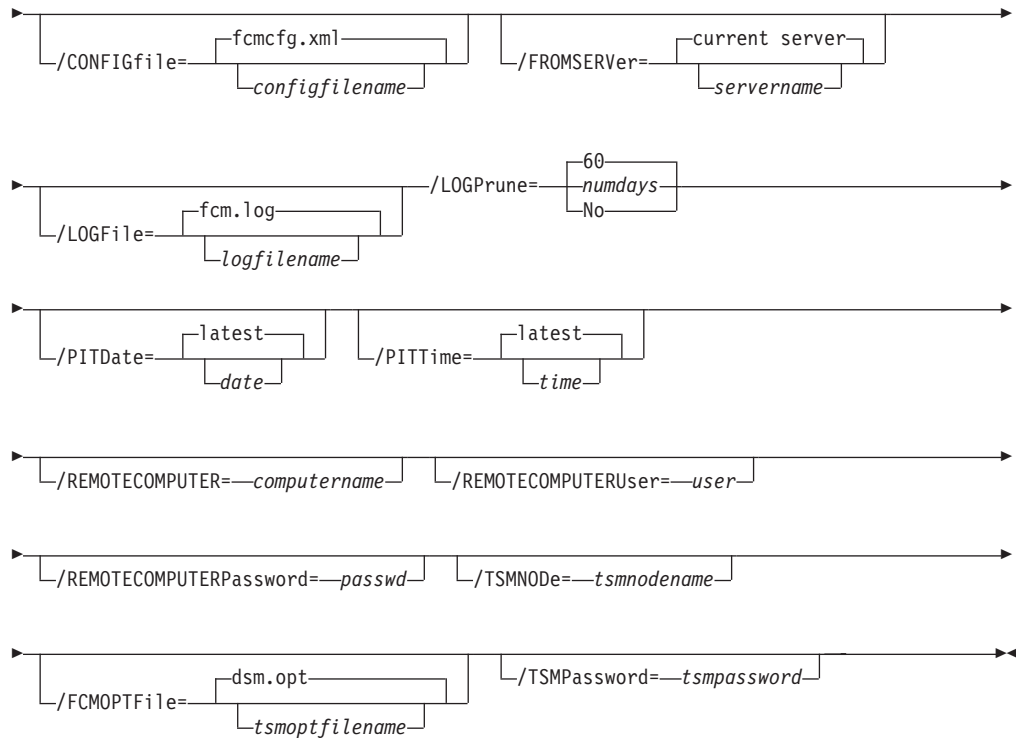
```
►─┬─────────────────────────────────────────┬──┬──────────────────────────────┬─►
  └─/CONFIGfile=─┬─fcmcfg.xml────────┬─┘  └─/FROMSERVer=─┬─current server─┬─┘
                 └─configfilename─┘                      └─servername─┘


►─┬──────────────────────────────────┬──/LOGPrune=─┬─60────────┬─────────────────►
  └─/LOGFile=─┬─fcm.log───────┬─┘                   ├─numdays─┤
             └─logfilename─┘                        └─No────────┘


►─┬────────────────────────────┬──┬───────────────────────────┬─────────────────►
  └─/PITDate=─┬─latest─┬─┘     └─/PITTime=─┬─latest─┬─┘
             └─date─┘                      └─time─┘


►─┬──────────────────────────────────────┬──┬────────────────────────────────┬──►
  └─/REMOTECOMPUTER=─computername─┘        └─/REMOTECOMPUTERUser=─user─┘


►─┬──────────────────────────────────────────┬──┬────────────────────────────┬──►
  └─/REMOTECOMPUTERPassword=─passwd─┘          └─/TSMNODe=─tsmnodename─┘


►─┬──────────────────────────────────────┬──┬────────────────────────────────┬──►◄
  └─/FCMOPTFile=─┬─dsm.opt──────────┬─┘  └─/TSMPassword=─tsmpassword─┘
               └─tsmoptfilename─┘
```

Mount backup positional parameter

The positional parameters immediately follow the `mount backup` command and precede the optional parameters.

The following positional parameters specify the objects to mount:

component name=*mount point*[*,component name*=*mount point*]

>   *component name*
>   Specify the volume or drive name of the component.
>
>   *mount point*
>   Specify an unused drive letter or absolute path to the directory where the snapshots are going to be displayed as mount point directories. The directory must be empty. If not empty, an error is reported.

The list must contain all non-qualified objects or all qualified objects. The list cannot contain a combination of non-qualified objects and qualified objects. Specify the list by using the following syntax:

```
mount backup object-1[(object-1-id)]= mount-point-1[,object-2[(object-2-id)]
=mount-point-2...]
```

For example:
```
fcmcli mount backup L:=X:

fcmcli mount backup g:(2011031112451)=x:
```

The following example is for a non-qualified object `object-1`:
```
fcmcli mount backup g:=x:
```

The following example is for a qualified object `object-1` (`object-1-id`):

```
fcmcli mount backup g:(20110815064316)=x:
```

Mount backup optional parameters

Optional parameters follow the **mount backup** command and positional parameters.

/CONFIGfile=*configfilename*

> Use the **/configfile** parameter to specify the name (*configfilename*) of the
> Tivoli Storage FlashCopy Manager configuration file that contains the
> values to use for a **mount backup** operation.
>
> The *configfilename* variable can include a fully qualified path. If the
> *configfilename* variable does not include a path, the Tivoli Storage
> FlashCopy Manager installation directory is used. If the **/configfile**
> parameter is not specified, or if the *configfilename* variable is not specified,
> the default value is fcmcfg.xml.
>
> If the *configfilename* variable includes spaces, enclose the entire **/configfile**
> parameter entry in double quotation marks. For example:
>
> /CONFIGfile="c:\Program Files\fcmcfg.xml"
>
> See "Update config positional parameters" on page 404 for descriptions of
> available configuration parameters.

/FCMOPTFile=*filename*

> Use the *filename* variable to identify the Tivoli Storage Manager options
> file.
>
> The file name can include a fully qualified path name. If no path is
> specified, the directory where Tivoli Storage FlashCopy Manager is
> installed is searched.
>
> If the *filename* variable includes spaces, enclose the entire **/FCMOPTFile**
> parameter entry in double quotation marks. For example:
>
> /FCMOPTFile="c:\Program Files\file.opt"
>
> The default is dsm.opt.

/FROMSERVer=*server-name*

> Use the **/fromserver** parameter to specify the name of the server where the
> original backup was done. The default is the local server.

/LOGFile=*logfilename*

> Use the **/logfile** parameter to specify the name of the activity log file that
> is generated by Tivoli Storage FlashCopy Manager. The *logfilename* variable
> identifies the name of the activity log file.
>
> If the specified log file does not exist, a new log file is created. If the
> specified log file exists, new log entries are appended to the file. The
> *logfilename* variable can include a fully qualified path. However, if no path
> is specified, the log file is written to the Tivoli Storage FlashCopy Manager
> installation directory.
>
> If the *logfilename* variable includes spaces, enclose the entire **/logfile**
> parameter entry in double quotation marks. For example:
>
> /LOGFile="c:\Program Files\myfcm.log"
>
> If the **/logfile** parameter is not specified, log records are written to the
> default log file, fcm.log.
>
> The **/logfile** parameter cannot be turned off, logging always occurs.

/LOGPrune=*numdays* | **No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, *60* days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:

- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/PITDAte=*date*

Use the **/pitdate** parameter with the **/pittime** parameter to establish a point in time for which you want to mount the latest version of your backups. Backups that were backed up on or before the date and time you specified, and, which were not deleted before the date and time you specified, are processed. Backup versions that you create after this date and time are ignored. Specify the appropriate date in the *date* variable; use the same format that you selected with the DATEFORMAT option in the Tivoli Storage FlashCopy Manager options file.

If neither *date* nor *time* is specified, then no date and time are established. By default the backup is mounted from the most recent available backup.

If either *date* or *time* is specified, then the backup is mounted from the earliest backup that is selected after the established mount date and time. If no backup after the established date and time is found, by default the backup is mounted from the most recent available backup.

Notes:

- If you specify both *date* and *time*, this selection establishes the mount backup period.
- If you specify *date* and you do not specify *time*, *time* defaults to a value of 23:59:59. This selection establishes the *date* at the specified date.
- If you specify *time* without *date*, then *date* defaults to the current date. This selection establishes the mount date and time as the current date at the specified *time*.

/PITTime=*time*

> Use the **/pittime** parameter with the **/pitdate** option to establish a point in time for which you want to mount the latest version of your backups. Files or images that were backed up on or before the date and time you specify, and that were not deleted before the date and time you specify, are processed. Backup versions that you create after this date and time are ignored. This option is ignored if you do not specify the **/pitdate** parameter. Specify the appropriate time in the *time* variable; use the same format that you selected with the TIMEFORMAT option in the Tivoli Storage FlashCopy Manager options file.
>
> If neither *date* nor *time* is specified, then no date and time are established. By default the backup is mounted from the most recent available backup.
>
> If either *date* or *time* is specified, then the backup is mounted from the earliest backup that is selected after the established mount date and time. If no backup after the established date and time is found, by default the backup is mounted from the most recent available backup.
>
> **Notes:**
> - If you specify both *date* and *time*, this selection establishes the mount backup period.
> - If you specify *date* and you do not specify *time*, *time* defaults to a value of 23:59:59. This selection establishes the *date* at the specified date.
> - If you specify *time* without *date*, then *date* defaults to the current date. This selection establishes the mount date and time as the current date at the specified *time*.

/REMOTECOMPUTER=*computername*

> Enter the IP address or host name for the remote system where you want to mount the data.

/REMOTECOMPUTERUser=*user*

> Enter the user name that is used to log on to the server specified with the **REMOTECOMPUTER** parameter. If a domain is required to log on with the domain account, enter *Domain\User*. To log on to the local account, the domain is not required. There is no default value.

/REMOTECOMPUTERPassword=*passwd*

> Enter the password for the user name that is specified with the **REMOTECOMPUTERUser** parameter. There is no default value.

/TSMNODe=*tsmnodename*

> Use the *tsmnodename* variable to refer to the Tivoli Storage Manager node name that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.
>
> You can store the node name in the Tivoli Storage Manager options file (dsm.opt). This parameter overrides the value in the Tivoli Storage Manager options file if PASSWORDACCESS is set to PROMPT. This parameter is not valid when PASSWORDACCESS is set to GENERATE in the options file.

/TSMOPTFile=*tsmoptfilename*

> Use the *tsmoptfilename* variable to identify the Tivoli Storage Manager options file.
>
> The file name can include a fully qualified path name. If no path is specified, the directory where Tivoli Storage FlashCopy Manager is installed is searched.

If the *tsmoptfilename* variable includes spaces, enclose the entire **/tsmoptfile** parameter entry in double quotation marks. For example:

/TSMOPTFile="c:\Program Files\file.opt"

The default is dsm.opt.

/TSMPassword=*tsmpassword*

Use the *tsmpassword* variable to refer to the Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

If you specified PASSWORDACCESS GENERATE in the Tivoli Storage FlashCopy Manager options file (dsm.opt), supplying the password is not necessary here because the one that is stored in the registry is used. However, to store the password in the registry, you must specify the Tivoli Storage Manager password the first time Tivoli Storage FlashCopy Manager connects to the Tivoli Storage Manager server.

If you do specify a password with this parameter when PASSWORDACCESS GENERATE is in effect, the command-line value is ignored unless the password for this node is not yet stored in the registry. In that case, the specified password is stored in the registry and used when you run this command.

If PASSWORDACCESS PROMPT is in effect, and you do not specify a password value on the command line, then you are prompted for a password.

The Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Mount backup examples

These output examples provide a sample of the text, messages, and process status that displays when you use the **mount backup** command.

In this example, the fcmcli mount backup C:=X: command mounts volume C:. The following output is displayed:

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 4, Release 1, Level 2.0
(C) Copyright IBM Corporation 2009, 2015. All rights reserved.

Preparing for a MOUNT BACKUP operation, please wait...

Connecting to TSM Server as node 'STRINGVM1_FS'...
Connecting to Local DSM Agent 'STRINGVM1'...

Backup(s) to be mounted:
C: = X: : VSS : full : 08/04/2014 13:08:50

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

In this example, the fcmcli mount backup D:\mnt\mp1=M:,D:\mnt\mp2=N: /PITDATE=08/07/2014 /PITTIME=08:53:36 command mounts multiple volumes. The following output is displayed:

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 4, Release 1, Level 2.0
(C) Copyright IBM Corporation 2009, 2015. All rights reserved.

Preparing for a MOUNT BACKUP operation, please wait...

Connecting to FCM Server as node 'TROYVM1_FS'...
Connecting to Local DSM Agent 'TROYVM1'...

Backup(s) to be mounted:

d:\mnt\mp1 = M: : VSS : full : 08/07/2014 08:53:35
d:\mnt\mp2 = N: : VSS : full : 08/07/2014 08:53:36
```

Query component command

Use the **query component** command to query the VSS components available on the system.

The **query component** command returns a list of the volume and mount points available for backup.

Query component syntax

Use the **query component** command syntax diagrams as a reference to view available options and truncation requirements.

FCMCLI command

►►──FCMCLI──Query COMPonent──►

    └─/CONFIGfile=──┬──fcmcfg.xml──────┬──┘
                    └──*configfilename*──┘

►──►

  └─/FCMOPTFile=──┬──dsm.opt──────────┬──┘ └─/LOGFile=──┬──fcm.log──────┬──┘
                  └──*tsmoptfilename*──┘   └──*logfilename*──┘

►──►

  └─/LOGPrune=──┬──60────────┬──┘ └─/TSMNODe=──*tsmnodename*──┘
               ├──*numdays*──┤
               └──No────────┘

►──►◄

  └─/TSMPassword=──*tsmpassword*──┘
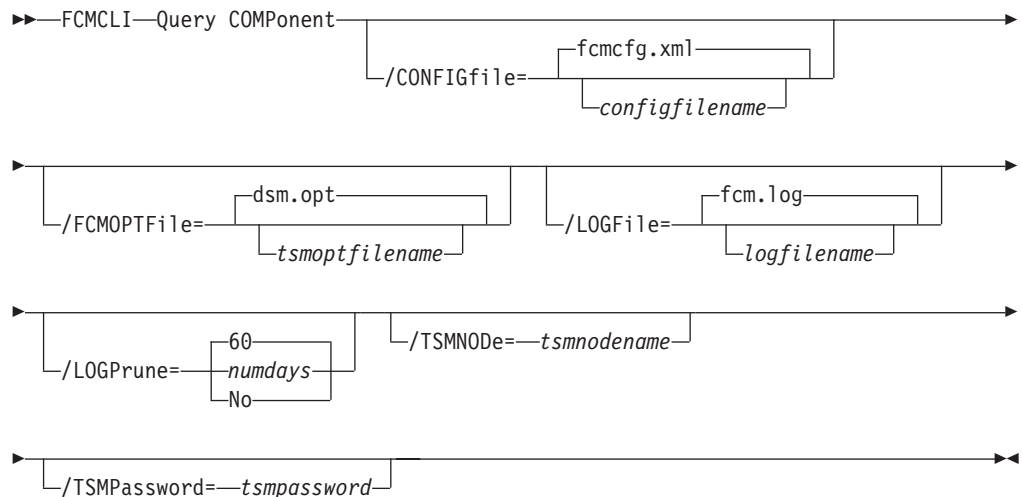
Query component optional parameters

Optional parameters follow the **query component** command.

/CONFIGfile=*filename*

Use the **/configfile** parameter to specify the name (*filename*) of the Tivoli Storage FlashCopy Manager configuration file that contains the values to use for a **query component** operation.

The *filename* variable can include a fully qualified path. If the *filename* variable does not include a path, the Tivoli Storage FlashCopy Manager installation directory is used. If the **/configfile** parameter is not specified, or if the *filename* variable is not specified, the default value is fcmcfg.xml.

If the *filename* variable includes spaces, enclose the entire **/configfile** parameter entry in double quotation marks. For example:

/CONFIGfile="c:\Program Files\fcmcfg.xml"

/FCMOPTFile=_filename_

Use the *filename* variable to identify the Tivoli Storage Manager options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Tivoli Storage FlashCopy Manager is installed is searched.

If the *filename* variable includes spaces, enclose the entire **/FCMOPTFile** parameter entry in double quotation marks. For example:

/FCMOPTFile="c:\Program Files\file.opt"

The default is dsm.opt.

/LOGFile=_filename_

Use the **/LOGFile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager. The *filename* variable identifies the name of the activity log file.

If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *filename* variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager installation directory.

If the *filename* variable includes spaces, enclose the entire **/LOGFile** parameter entry in double quotation marks. For example:

/LOGFile="c:\Program Files\myfcm.log"

If the **/LOGFile** parameter is not specified, log records are written to the default log file, fcm.log.

The **/LOGFile** parameter cannot be turned off, logging always occurs.

/LOGPrune=_numdays_|**No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, *60* days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:
- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60.*
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.

- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/TSMNODe=_nodename_

Use the _nodename_ variable to refer to the Tivoli Storage Manager node name that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

You can store the node name in the Tivoli Storage Manager options file (dsm.opt). This parameter overrides the value in the Tivoli Storage Manager options file if **PASSWORDACCESS** is set to PROMPT. This parameter is not valid when **PASSWORDACCESS** is set to GENERATE in the options file.

/TSMPassword=_password_

Use the _password_ variable to refer to the Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

If you specified PASSWORDACCESS GENERATE in the Tivoli Storage FlashCopy Manager options file (dsm.opt), supplying the password is not necessary here because the one that is stored in the registry is used. However, to store the password in the registry, you must specify the Tivoli Storage Manager password the first time Tivoli Storage FlashCopy Manager connects to the Tivoli Storage Manager server.

If you do specify a password with this parameter when PASSWORDACCESS GENERATE is in effect, the command-line value is ignored unless the password for this node is not yet stored in the registry. In that case, the specified password is stored in the registry and used when you run this command.

If PASSWORDACCESS PROMPT is in effect, and you do not specify a password value on the command line, then you are prompted for a password.

The Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Query component examples

Examples of how to use the **query component** command are provided.

To query components that are associated with a configuration file, for example, customconfig.xml, enter the following command:

```
fcmcli query component /configfile=customconfig.xml
```

To query components for a list of the volume and mount points that are available for backup, enter the following command:

```
fcmcli query component
```

Query config command

Use the **query config** command to display Tivoli Storage FlashCopy Manager configuration information.

The **query config** command displays the following information:
- The value of each **configuration parameters** parameter
- Tivoli Storage FlashCopy Manager connection and configuration information
- Tivoli Storage Manager server connection and configuration information

Query config syntax

Use the **query config** command syntax diagrams as a reference to view available options and truncation requirements.

FCMCLI command

```
►►──FCMCLI──Query CONFig──────────────────────────────────────────────────►

                         ┌──fcmcfg.xml──┐
       └──/CONFIGfile=──┤              ├──┘
                         └──filename────┘


                  ┌──dsm.opt──┐                    ┌──fcm.log──┐
►──┤ └──/FCMOPTFile=┤         ├─┘  └──/LOGFile=──┤          ├──┘ ──►
                    └─filename─┘                  └─filename─┘


            ┌──60──────┐
►──┤ └──/LOGPrune=──┤─numdays─├──┘  └──/TSMNODe=──nodename─┘ ──────►
                    └─No──────┘


►──┤ └──/TSMPassword=──password─┘ ────────────────────────────────────►◄
```
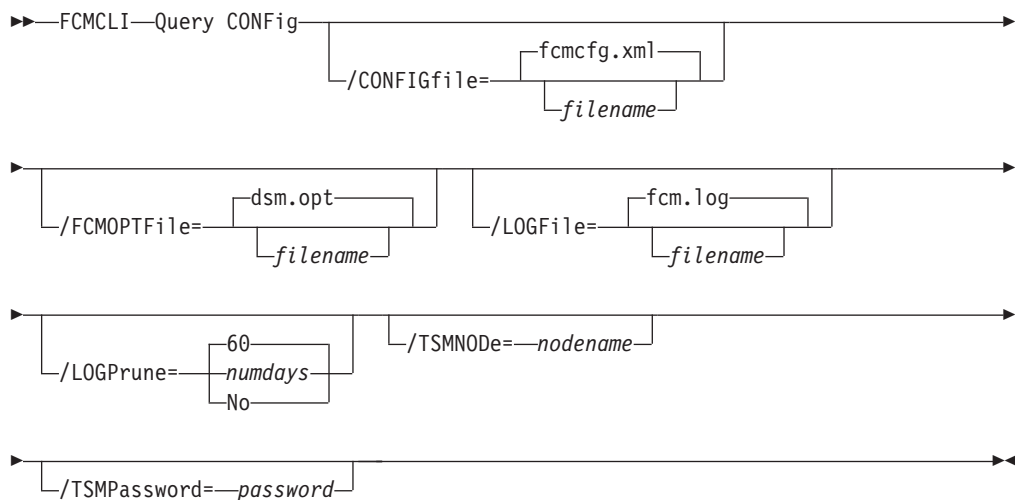
Query config optional parameters

Optional parameters follow the **query config** command.

/CONFIGfile=*filename*

Use the **/CONFIGfile** parameter to specify the name (*filename*) of the Tivoli Storage FlashCopy Manager configuration file that contains the values to use for a **query config** operation.

The *filename* variable can include a fully qualified path. If the *filename* variable does not include a path, the Tivoli Storage FlashCopy Manager installation directory is used. If the **/CONFIGfile** parameter is not specified, or if the *filename* variable is not specified, the default value is fcmcfg.xml.

If the *filename* variable includes spaces, enclose the entire **/CONFIGfile** parameter entry in double quotation marks. For example:

/CONFIGfile="c:\Program Files\fcmcfg.xml"

/FCMOPTFile=*filename*

Use the *filename* variable to identify the Tivoli Storage Manager options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Tivoli Storage FlashCopy Manager is installed is searched.

If the *filename* variable includes spaces, enclose the entire **/FCMOPTFile** parameter entry in double quotation marks. For example:

/FCMOPTFile="c:\Program Files\file.opt"

The default is dsm.opt.

/LOGFile=_filename_

Use the **/LOGFile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager. The *filename* variable identifies the name of the activity log file.

If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *filename* variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager installation directory.

If the *filename* variable includes spaces, enclose the entire **/logfile** parameter entry in double quotation marks. For example:

/LOGFile="c:\Program Files\myfcm.log"

If the **/LOGFile** parameter is not specified, log records are written to the default log file, fcm.log.

The **/LOGFile** parameter cannot be turned off, logging always occurs.

/LOGPrune=_numdays_|**No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, *60* days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:
* For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
* If you specify no, the log file is not pruned.
* If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
* If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
* You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
* Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/TSMNODe=_nodename_

Use the _nodename_ variable to refer to the Tivoli Storage Manager node name that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

You can store the node name in the Tivoli Storage Manager options file (`dsm.opt`). This parameter overrides the value in the Tivoli Storage Manager options file if **PASSWORDACCESS** is set to PROMPT. This parameter is not valid when **PASSWORDACCESS** is set to GENERATE in the options file.

/TSMPassword=_password_

Use the _password_ variable to refer to the Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

If you specified PASSWORDACCESS GENERATE in the Tivoli Storage FlashCopy Manager options file (`dsm.opt`), supplying the password is not necessary here because the one that is stored in the registry is used. However, to store the password in the registry, you must specify the Tivoli Storage Manager password the first time Tivoli Storage FlashCopy Manager connects to the Tivoli Storage Manager server.

If you do specify a password with this parameter when PASSWORDACCESS GENERATE is in effect, the command-line value is ignored unless the password for this node is not yet stored in the registry. In that case, the specified password is stored in the registry and used when you run this command.

If PASSWORDACCESS PROMPT is in effect, and you do not specify a password value on the command line, then you are prompted for a password.

The Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Query backup command

Use the **query backup** command to query a list of the backups that are being managed by Tivoli Storage FlashCopy Manager and the Tivoli Storage Manager server.

Query backup syntax

Use the **query backup** command syntax diagrams as a reference to view available options and truncation requirements.

FCMCLI command

```
►►──FCMCLI──Query BACKup──┬──*─────────────────────┬──┬────────┬──────────►
                          └─component name list──┘  └─/ALl──┘

►──┬──────────────────────────────────┬──┬─────────────────────────────┬──►
   │              ┌─tdpexc.cfg─┐       │  │             ┌─dsm.opt─┐      │
   └─/CONFIGfile=─┼────────────┤──────┘  └─/FCMOPTFile=─┼─────────┤─────┘
                  └─filename──┘                         └─filename─┘
```

```
                          ┌─server name─┐                  ┌─tdpexc.log─┐
├──┬─────────────────────────────────────┬───┬──────────────────────────────┬──►
   └─/FROMSERVer=─┬─────────────────────┬─┘   └─/LOGFile=─┬──────────────┬──┘
                  └─ current server ────┘                 └─ filename ───┘

       ┌─60───────┐
├──┬─────────────────────┬───┬───────────────────────────────────┬──────────────►
   └─/LOGPrune=─┬─numdays─┬─┘ └─/REMOTECOMPUTER=─ computername ───┘
               └─No──────┘

├──┬──────────────────────────────┬───┬──────────────────────────────────────┬──►
   └─/REMOTECOMPUTERUser=─ user ──┘   └─/REMOTECOMPUTERPassword=─ passwd ────┘

├──┬─────────────────────────┬───┬───────────────────────────────┬──────────────►◄
   └─/TSMNODe=─ nodename ────┘   └─/TSMPassword=─ password ──────┘
```
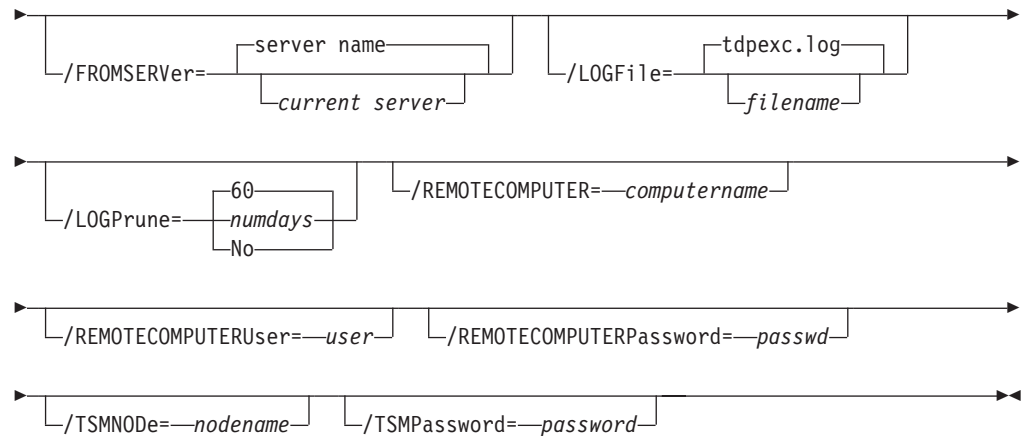
Query backup positional parameter

The positional parameter immediately follows the **query backup** command and precedes the optional parameters.

Specify the following positional parameters with the **query backup** command:

component name list | *

>
> *component name list*
> > Specify a list of volume or mount points to query.
>
> * All backups are queried and shown in the command output. This option is the default value.

Query backup optional parameters

Optional parameters follow the **query backup** command and positional parameter.

/ALl Use the **/all** parameter to display both active and inactive backup objects. If the **/all** parameter is not specified, only active backup objects are displayed.

/CONFIGfile=_configfilename_
> Use the **/configfile** parameter to specify the name (*configfilename*) of the Tivoli Storage FlashCopy Manager configuration file that contains the values to use for a **query backup** operation.
>
> The *configfilename* variable can include a fully qualified path. If the *configfilename* variable does not include a path, the Tivoli Storage FlashCopy Manager installation directory is used. If the **/configfile** parameter is not specified, or if the *configfilename* variable is not specified, the default value is fcmcfg.xml.
>
> If the *configfilename* variable includes spaces, enclose the entire **/configfile** parameter entry in double quotation marks. For example:
> /CONFIGfile="c:\Program Files\fcmcfg.xml"

/FCMOPTFile=_filename_
> Use the *filename* variable to identify the Tivoli Storage Manager options file.
>
> The file name can include a fully qualified path name. If no path is specified, the directory where Tivoli Storage FlashCopy Manager is installed is searched.

If the *filename* variable includes spaces, enclose the entire **/FCMOPTFile**
parameter entry in double quotation marks. For example:

```
/FCMOPTFile="c:\Program Files\file.opt"
```

The default is dsm.opt.

/FROMSERVer=*server name*

Use the **/fromserver** parameter to specify the name of the server where the
original backup was done. The default is the current server.

/LOGFile=*logfilename*

Use the **/logfile** parameter to specify the name of the activity log file that
is generated by Tivoli Storage FlashCopy Manager. The *logfilename* variable
identifies the name of the activity log file.

If the specified log file does not exist, a new log file is created. If the
specified log file exists, new log entries are appended to the file. The
logfilename variable can include a fully qualified path. However, if no path
is specified, the log file is written to the Tivoli Storage FlashCopy Manager
installation directory.

If the *logfilename* variable includes spaces, enclose the entire **/logfile**
parameter entry in double quotation marks. For example:

```
/LOGFile="c:\Program Files\myfcm.log"
```

If the **/logfile** parameter is not specified, log records are written to the
default log file, fcm.log.

The **/logfile** parameter cannot be turned off, logging always occurs.

/LOGPrune=*numdays*|**No**

When you prune log data, you can discard some of the generated logs
according to detailed filtering criteria that you set. Depending on the
option that you set for the **/LOGPrune** parameter, a certain number of days
of data are saved. By default, *60* days of log entries are saved. The option
No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly
request log pruning at any time.

Considerations:
- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in
  the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the
  logprune configurable option in the configuration file. The default value
  is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is
  stored in the configuration file. Specifying this parameter does not
  change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case,
  the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can
  result in an unwanted pruning of the log file. If you are running a
  command that might prune the log file, and the value of the **TIMEformat**
  or **DATEformat** parameter is changed, complete one of the following to
  prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.

– Specify a new log file with the **/LOGFile** parameter or `logfile` setting.

/REMOTECOMPUTER=*computername*
>Enter the IP address or host name for the remote system where you want to query the data that is backed up.

/REMOTECOMPUTERUser=*user*
>Enter the user name that is used to log on to the server specified with the **REMOTECOMPUTER** parameter. If a domain is required to log on with the domain account, enter *Domain\User*. To log on to the local account, the domain is not required. There is no default value.

/REMOTECOMPUTERPassword=*passwd*
>Enter the password for the user name that is specified with the **REMOTECOMPUTERUser** parameter. There is no default value.

/TSMNODe=*nodename*
>Use the *nodename* variable to refer to the Tivoli Storage Manager node name that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

>You can store the node name in the Tivoli Storage Manager options file (`dsm.opt`). This parameter overrides the value in the Tivoli Storage Manager options file if **PASSWORDACCESS** is set to `PROMPT`. This parameter is not valid when **PASSWORDACCESS** is set to `GENERATE` in the options file.

/TSMPassword=*password*
>Use the *password* variable to refer to the Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

>If you specified `PASSWORDACCESS GENERATE` in the Tivoli Storage FlashCopy Manager options file (`dsm.opt`), supplying the password is not necessary here because the one that is stored in the registry is used. However, to store the password in the registry, you must specify the Tivoli Storage Manager password the first time Tivoli Storage FlashCopy Manager connects to the Tivoli Storage Manager server.

>If you do specify a password with this parameter when `PASSWORDACCESS GENERATE` is in effect, the command-line value is ignored unless the password for this node is not yet stored in the registry. In that case, the specified password is stored in the registry and used when you run this command.

>If `PASSWORDACCESS PROMPT` is in effect, and you do not specify a password value on the command line, then you are prompted for a password.

>The Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Query backup example

This output example provides a sample of the text, messages, and process status that displays when you use the **query backup** command.

The **fcmcli query backup * /all** command displays information about all active and inactive backups that are managed by Tivoli Storage FlashCopy Manager. An example of the output is provided.

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 4, Release 1, Level 2.0
(C) Copyright IBM Corporation 2009, 2015. All rights reserved.

Querying backups, please wait...

Connecting to FCM Server as node 'JUNE_FS'...
Connecting to Local DSM Agent 'JUNE'...


Backups for Volume/Mount Point: 'F:'
===============================================================
Volume/Mount Point        : F:
Volume GUID               : aa3683af-4bdc-11de-b146-001a6499a400
Server                    : JUNE
Volume Occupancy          :    10.13MB
Backup Date/Time          : 03/31/2014 07:35:11
Backup State              : Active
Management Class          : DEFAULT
Mounted as                :
Object Name               : 20140331073511
Instant Restore Supported : No

Volume/Mount Point        : F:
Volume GUID               : aa3683af-4bdc-11de-b146-001a6499a400
Server                    : JUNE
Volume Occupancy          :    10.13MB
Backup Date/Time          : 03/30/2014 13:50:44
Backup State              : Inactive
Management Class          : DEFAULT
Mounted as                :
Object Name               : 20140330135044
Instant Restore Supported : No


Backups for Volume/Mount Point: 'O:'
===============================================================
Volume/Mount Point        : O:
Volume GUID               : aa3683b2-4bdc-11de-b146-001a6499a400
Server                    : JUNE
Volume Occupancy          :    10.12MB
Backup Date/Time          : 03/31/2014 07:35:50
Backup State              : Active
Management Class          : DEFAULT
Mounted as                :
Object Name               : 20140331073550
Instant Restore Supported : No

Volume/Mount Point        : O:
Volume GUID               : aa3683b2-4bdc-11de-b146-001a6499a400
Server                    : JUNE
Volume Occupancy          :    10.12MB
Backup Date/Time          : 03/31/2014 07:24:44
Backup State              : Inactive
Management Class          : DEFAULT
Mounted as                :
Object Name               : 20140331072444
Instant Restore Supported : No
```

The **fcmcli query backup** command displays information about backups that are managed by Tivoli Storage FlashCopy Manager. An example of the output is provided.

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 4, Release 1, Level 2.0
(C) Copyright IBM Corporation 2009, 2015. All rights reserved.

Querying backups, please wait...

Connecting to FCM Server as node 'JUNE_FS'...
Connecting to Local DSM Agent 'JUNE'...


Backups for Volume/Mount Point: 'F:'
===============================================================
Volume/Mount Point        : F:
Volume GUID               : aa3683af-4bdc-11de-b146-001a6499a400
Server                    : JUNE
Volume Occupancy          :     10.13MB
Backup Date/Time          : 03/31/2014 07:35:11
Backup State              : Active
Management Class          : DEFAULT
Mounted as                :
Object Name               : 20140331073511
Instant Restore Supported : No


Backups for Volume/Mount Point: 'O:'
===============================================================
Volume/Mount Point        : O:
Volume GUID               : aa3683b2-4bdc-11de-b146-001a6499a400
Server                    : JUNE
Volume Occupancy          :     10.12MB
Backup Date/Time          : 03/31/2014 07:35:50
Backup State              : Active
Management Class          : DEFAULT
Mounted as                :
Object Name               : 20140331073550
Instant Restore Supported : No
```

The **fcmcli query backup** command displays information about backups that are managed by Tivoli Storage FlashCopy Manager. An example of the output is provided.

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 4, Release 1, Level 2.0
(C) Copyright IBM Corporation 2009, 2015. All rights reserved.

Querying backups, please wait...

Connecting to FCM Server as node 'JUNE_FS'...
Connecting to Local DSM Agent 'JUNE'...


Backups for Volume/Mount Point: 'F:'
============================================================================
Volume/Mount Point        : F:
Volume GUID               : aa3683af-4bdc-11de-b146-001a6499a400
Server                    : JUNE
Volume Occupancy          :    10.13MB
Backup Date/Time          : 03/31/2014 07:35:11
Backup State              : Active
Management Class           : DEFAULT
Mounted as                :
Object Name               : 20140331073511
Instant Restore Supported : No


Backups for Volume/Mount Point: 'O:'
============================================================================
Volume/Mount Point        : O:
Volume GUID               : aa3683b2-4bdc-11de-b146-001a6499a400
Server                    : JUNE
Volume Occupancy          :    10.12MB
Backup Date/Time          : 03/31/2014 07:35:50
Backup State              : Active
Management Class           : DEFAULT
Mounted as                :
Object Name               : 20140331073550
Instant Restore Supported : No
```

Query managedcapacity command

When you plan for storage, if you want to determine the amount of managed capacity in use, use the `query managedcapacity` command.

The `query managedcapacity` command displays capacity that is related information about the volumes that are represented in local inventory that is managed by Tivoli Storage FlashCopy Manager. This command is valid for all Windows operating systems that are supported by Tivoli Storage FlashCopy Manager.

FCMCLI command
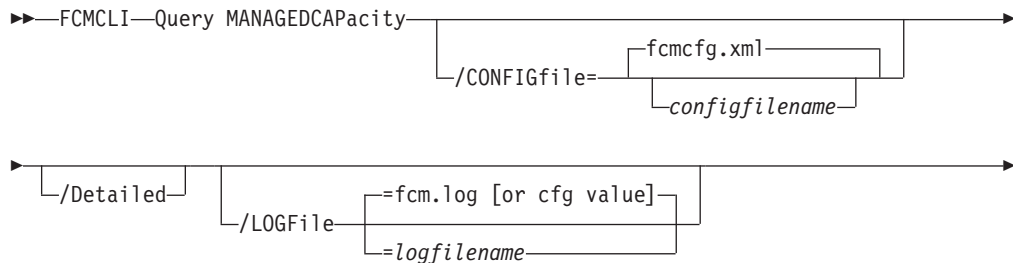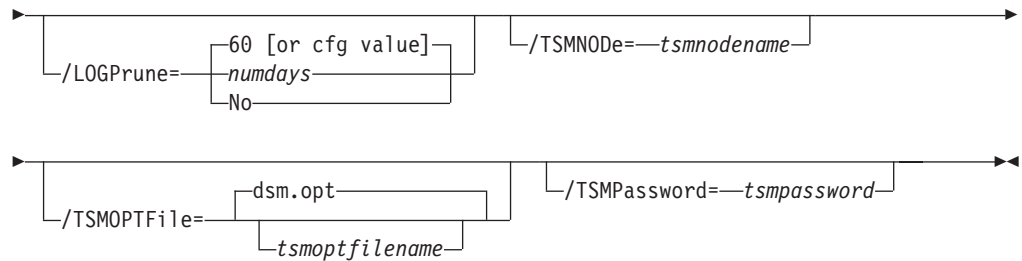
```
►►──FCMCLI──Query MANAGEDCAPacity──────────────────────────────────────►
                              │                      ┌─fcmcfg.xml─┐       │
                              └─/CONFIGfile=──┴────────────┴──────┘
                                             └─configfilename─┘


►──┬───────────┬──┬──────────────────────────────────────┬─────────────►
   └─/Detailed─┘  │          ┌─=fcm.log [or cfg value]─┐  │
                  └─/LOGFile──┼─────────────────────────┼──┘
                             └─=logfilename──────────────┘
```

```
          ┌─60 [or cfg value]─┐           ┌─/TSMNODe=──tsmnodename─┐
├────┬─────────────────────────────────────┬───┬────────────────────────┬──────►
     └─/LOGPrune=──┬─────────────────────┬─┘   └────────────────────────┘
                   ├─numdays─────────────┤
                   └─No──────────────────┘

          ┌─dsm.opt──────────┐              ┌─/TSMPassword=──tsmpassword─┐
►─┬────────────────────────────────────┬───┬────────────────────────────┬─►◄
  └─/TSMOPTFile=──┬──────────────────┬─┘   └────────────────────────────┘
                  └─tsmoptfilename───┘
```

Parameters

/CONFIGfile=_configfilename_

Use the **/CONFIGfile** parameter to specify the name (_configfilename_) of the configuration file that contains the values to use for a **query managedcapacity** operation.

The _configfilename_ variable can include a fully qualified path. If the _configfilename_ variable does not include a path, the Tivoli Storage FlashCopy Manager installation directory is used. If the **/CONFIGfile** parameter is not specified, or if the _configfilename_ variable is not specified, the default value is fcmcfg.xml.

If the _configfilename_ variable includes spaces, enclose the entire **/CONFIGfile** parameter entry in double quotation marks. For example:

/CONFIGfile="c:\Program Files\fcmcfg.xml"

/Detailed

Results in a detailed listing of snapped volumes. If this option is not specified, only the total capacity is displayed.

/LOGFile=_logfilename_

Use the **/LOGFile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager. The _logfilename_ variable identifies the name of the activity log file.

If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The _logfilename_ variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager installation directory.

If the _logfilename_ variable includes spaces, enclose the entire **/LOGFile** parameter entry in double quotation marks. For example:

/LOGFile="c:\Program Files\myfcm.log"

If the **/LOGFile** parameter is not specified, log records are written to the default log file, fcm.log.

The **/LOGFile** parameter cannot be turned off, logging always occurs.

/LOGPrune=_numdays_|**No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, _60_ days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:

- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
- If you specify no, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/TSMNODe=*tsmnodename*
Use the *tsmnodename* variable to refer to the Tivoli Storage Manager node name that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

You can store the node name in the Tivoli Storage Manager options file (dsm.opt). This parameter overrides the value in the Tivoli Storage Manager options file if **PASSWORDACCESS** is set to PROMPT. This parameter is not valid when **PASSWORDACCESS** is set to GENERATE in the options file.

/TSMOPTFile=*tsmoptfilename*
Use the *tsmoptfilename* variable to identify the Tivoli Storage Manager options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Tivoli Storage FlashCopy Manager is installed is searched.

If the *tsmoptfilename* variable includes spaces, enclose the entire **/tsmoptfile** parameter entry in double quotation marks. For example:

/TSMOPTFile="c:\Program Files\file.opt"

The default is dsm.opt.

/TSMPassword=*tsmpassword*
Use the *tsmpassword* variable to refer to the Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

If you specified **PASSWORDACCESS** GENERATE in the Tivoli Storage FlashCopy Manager options file (dsm.opt), supplying the password is not necessary here because the one that is stored in the registry is used. However, to store the password in the registry, you must specify the Tivoli Storage Manager password the first time Tivoli Storage FlashCopy Manager connects to the Tivoli Storage Manager server.

If you do specify a password with this parameter when **PASSWORDACCESS** GENERATE is in effect, the command-line value is ignored unless the password for this node is not yet stored in the registry. In that case, the specified password is stored in the registry and used when you run this command.

If **PASSWORDACCESS** PROMPT is in effect, and you do not specify a password value on the command line, you are prompted for a password.

The Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

For examples of how to use the **query managedcapacity** command, use the following list:
- To display the total amount of managed capacity in use in the local inventory, enter the **fcmcli query managedcapacity** command.

  If there are local backups, the following code sample can be used as a reference:

  ```
  c:\Program Files\Tivoli\FlashCopyManager>fcmcli query managedcapacity

  FlashCopy Manager for Windows:
  IBM Tivoli Storage FlashCopy Manager
  Version 4, Release 1, Level 1.0
  (C) Copyright IBM Corporation 2009, 2014. All rights reserved.

  Preparing for a QUERY MANAGEDCAPACITY operation, please wait...


  Total Managed Capacity : 84.26 GB (90,476,371,968 bytes)
  ```

  If there are no local backups, the following code sample can be used as a reference:

  ```
  c:\Program Files\Tivoli\FlashCopyManager>fcmcli query managedcapacity

  FlashCopy Manager for Windows:
  IBM Tivoli Storage FlashCopy Manager
  Version 4, Release 1, Level 1.0
  (C) Copyright IBM Corporation 2009, 2014. All rights reserved.

  Preparing for a QUERY MANAGEDCAPACITY operation, please wait...


  Total Managed Capacity : 0
  ```
- To display a detailed listing of total amount of managed capacity and the snapped volumes in use, enter the **fcmcli query managedcapacity /detailed** command.

  If there are local backups, the following code sample can be used as a reference:

  ```
  c:\Program Files\Tivoli\FlashCopyManager>fcmcli query managedcapacity /detail

  FlashCopy Manager for Windows:
  IBM Tivoli Storage FlashCopy Manager
  Version 4, Release 1, Level 1.0
  (C) Copyright IBM Corporation 2009, 2014. All rights reserved.

  Preparing for a QUERY MANAGEDCAPACITY operation, please wait...


  Total Managed Capacity : 84.26 GB (90,476,371,968 bytes)

  Volume           : C:
  Managed Capacity : 68.27 GB (73,299,652,608 bytes)

  Volume           : c:\mp
  Managed Capacity : 16.00 GB (17,176,719,360 bytes)
  ```

  If there are no local backups, the following code sample can be used as a reference:

```
c:\Program Files\Tivoli\FlashCopyManager>fcmcli query managedcapacity /detail

FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 4, Release 1, Level 1.0
(C) Copyright IBM Corporation 2009, 2014. All rights reserved.

Preparing for a QUERY MANAGEDCAPACITY operation, please wait...


Total Managed Capacity : 0
```

Restore command

Use the **restore** command to restore a Tivoli Storage FlashCopy Manager backup.

You must have local registry rights to run a Tivoli Storage FlashCopy Manager for Exchange Server restore.

VSS operations require special considerations that must be reviewed before you attempt a VSS Restore. See these two sections for important guidelines:

The GUI provides an easy-to-use, flexible interface to help you run a restore operation. The interface presents information in a way that allows multiple selection and, in some cases, automatic operation.

Restore syntax

Use the **restore** command syntax diagrams as a reference to view available options and truncation requirements.

FCMCLI command

```
►►──FCMCLI──RESTore──component name list──────────────────────────────►

►──────────────────────────────────────────────────────────────────────►
   └─/CONFIGfile=─┬─fcmcfg.xml─────┬─┘
                  └─configfilename─┘

►──────────────────────────────────────────────────────────────────────►
   └─/FROMSERVer=─┬─current server─┬─┘  └─/INSTANTRestore=─┬─Yes─┬─┘
                  └─servername─────┘                       └─No──┘

►──────────────────────────────────────────────────────────────────────►
   └─/INTO=─┬─volume-drive─────┬─┘  └─/LOGFile=─┬─fcm.log─────┬─┘
            └─mount-point-dir──┘                └─logfilename─┘

►──────────────────────────────────────────────────────────────────────►
   └─/LOGPrune=─┬─60──────┬─┘  └─/NOPROMPT─┘  └─/PITDate=─┬─latest─┬─┘
               ├─numdays─┤                                └─date───┘
               └─No──────┘
```

```
├──────────────────────────────────────────────────────────────────────────────┤
            └─/PITTime=─┬─latest─┬─       └─/TSMNODe=──tsmnodename─┘
                        └──time──┘

├──────────────────────────────────────────────────────────────────────────────┤
            └─/TSMOPTFile=─┬─dsm.opt─────────┬─   └─/TSMPassword=──tsmpassword─┘
                           └─tsmoptfilename──┘
```
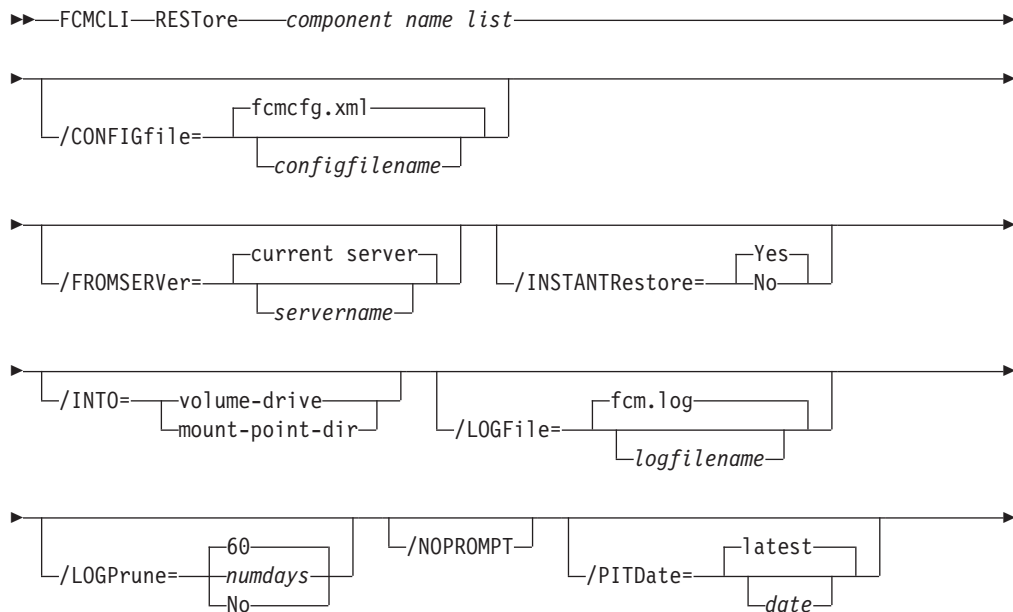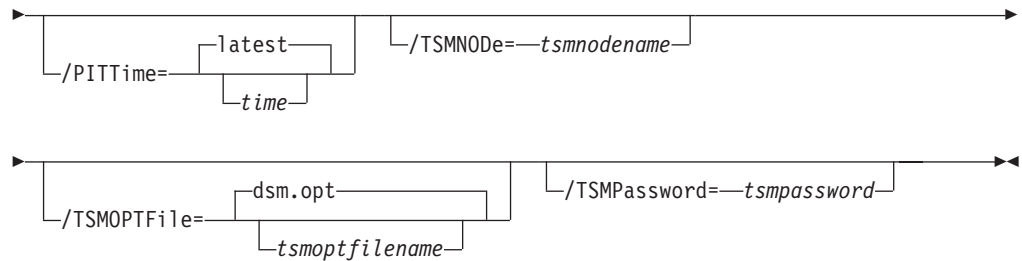
Restore positional parameter

The positional parameter immediately follows the **restore** command and precedes
the optional parameters.

Specify the following positional parameter with the **restore** command:

component name list

Specify a list of volume or mount points to restore. The list must contain
all non-qualified objects or all qualified objects. The list cannot contain a
combination of non-qualified objects and qualified objects.

Specify the component name list by using the following syntax:

```
comp-1[(object-1-id)][,comp-2[(object-2-id)]...]
```

where *comp-n* is the component to restore, and *obj-id-n* is the object ID of the
specific backup to restore. The object ID can be obtained through the **query backup**
command.

For example:

```
fcmcli restore g:(20110311124516),h:(20110211034512),r:(20101114164310)
```

Restore optional parameters

Optional parameters follow the **restore** command and positional parameters.

/CONFIGfile=*configfilename*

Use the **/configfile** parameter to specify the name (*configfilename*) of the
Tivoli Storage FlashCopy Manager configuration file that contains the
values to use for a **restore** operation.

The *configfilename* variable can include a fully qualified path. If the
configfilename variable does not include a path, the Tivoli Storage
FlashCopy Manager installation directory is used. If the **/configfile**
parameter is not specified, or if the *configfilename* variable is not specified,
the default value is fcmcfg.xml.

If the *configfilename* variable includes spaces, enclose the entire **/configfile**
parameter entry in double quotation marks. For example:

```
/CONFIGfile="c:\Program Files\fcmcfg.xml"
```

See "Update config positional parameters" on page 404 for descriptions of
available configuration parameters.

/FROMSERVer=*server-name*

Use the **/fromserver** parameter to specify the name of the server where the
original backup was done. The default is the local server.

/INSTANTRestore=Yes | No

> Use the **/instantrestore** parameter to specify whether to use volume level snapshot or file level copy to restore a VSS backup that are on local shadow volumes. An IBM Systems Storage SAN Volume Controller, DS8000, the XIV system, and IBM Storwize V7000 storage subsystem is required to perform VSS instant restores.
>
> You can specify:
>
> **Yes**   Use volume level snapshot restore for a VSS backup on local shadow volumes if the backup exists on volumes that support it. This option is the default.
>
> **No**   Use file level copy to restore the files from a VSS backup on local shadow volumes. Bypassing volume-level copy means that Exchange log files and the checkpoint file are the only data overwritten on the source volumes.
>
> When you complete VSS instant restores with DS8000, make sure that any previous background copies (that involve the volumes that are being restored) are completed before you initiate the VSS instant restore. The **/instantrestore** parameter is ignored and VSS instant restore capabilities are automatically disabled when performing any type of VSS restore into operation. VSS instant restore of differential and incremental backups is not supported.

/INTO=*volume-drive* **|** *mount-point-dir*

> Use the **/into** parameter to restore the backup that is stored on Tivoli Storage Manager server to an alternate destination.
>
> You can specify either *volume-drive* or *mount-point-dir*. The *volume-drive* or *mount-point-dir* location that you specify must be present on the server; the location is not dynamically created.
>
> The **/into** parameter is supported for one restore per command. Multiple restore specifications with the **/into** parameter are not supported.
>
> The following sample provides an example of how to use the parameter:
>
> ```
> FCMCLI RESTORE M: /INTO=P:
> ```

/LOGFile=*logfilename*

> Use the **/logfile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager. The *logfilename* variable identifies the name of the activity log file.
>
> If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *logfilename* variable can include a fully qualified path. However, if no path is specified, the log file is written to the Tivoli Storage FlashCopy Manager installation directory.
>
> If the *logfilename* variable includes spaces, enclose the entire **/logfile** parameter entry in double quotation marks. For example:
>
> ```
> /LOGFile="c:\Program Files\myfcm.log"
> ```
>
> If the **/logfile** parameter is not specified, log records are written to the default log file, fcm.log.
>
> The **/logfile** parameter cannot be turned off, logging always occurs.

/LOGPrune=*numdays***|No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days of data are saved. By default, *60* days of log entries are saved. The option No can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly request log pruning at any time.

Considerations:

- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in the activity log file except for the current command entries.
- If you specify *no*, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the **logprune** configurable option in the configuration file. The default value is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is stored in the configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/NOPROMPT

When the **restore** command is issued, you are prompted to confirm whether to overwrite the volumes you specified for restore. Use the **/noprompt** parameter to bypass this prompt and proceed with the restore operation.

/PITDAte=*date*

Use the **/pitdate** parameter with the **/pittime** parameter to establish a point in time for which you want to restore the latest version of your backups. Backups that were backed up on or before the date and time you specified, and, which were not deleted before the date and time you specified, are processed. Backup versions that you create after this date and time are ignored. Specify the appropriate date in the *date* variable; use the same format that you selected with the DATEFORMAT option in the Tivoli Storage FlashCopy Manager options file.

If neither *date* nor *time* is specified, then no date and time are established. By default the backup is restored from the most recent available backup.

If either *date* or *time* is specified, then the backup is restored from the earliest backup that is selected after the established restore date and time. If no backup after the established date and time is found, by default the backup is restored from the most recent available backup.

Notes:

- If you specify both *date* and *time*, this selection establishes the restore period.

- If you specify *date* and you do not specify *time*, *time* defaults to a value of 23:59:59. This selection establishes the *date* at the specified date.
- If you specify *time* without *date*, then *date* defaults to the current date. This selection establishes the restore date and time as the current date at the specified *time*.

/PITTime=*time*

Use the **/pittime** parameter with the **/pitdate** option to establish a point in time for which you want to restore the latest version of your backups. Files or images that were backed up on or before the date and time you specify, and that were not deleted before the date and time you specify, are processed. Backup versions that you create after this date and time are ignored. This option is ignored if you do not specify the **/pitdate** parameter. Specify the appropriate time in the *time* variable; use the same format that you selected with the TIMEFORMAT option in the Tivoli Storage FlashCopy Manager options file.

If neither *date* nor *time* is specified, then no date and time are established. By default the backup is restored from the most recent available backup.

If either *date* or *time* is specified, then the backup is restored from the earliest backup that is selected after the established restore date and time. If no backup after the established date and time is found, by default the backup is restored from the most recent available backup.

Notes:
- If you specify both *date* and *time*, this selection establishes the restore period.
- If you specify *date* and you do not specify *time*, *time* defaults to a value of 23:59:59. This selection establishes the *date* at the specified date.
- If you specify *time* without *date*, then *date* defaults to the current date. This selection establishes the restore date and time as the current date at the specified *time*.

/TSMNODe=*tsmnodename*

Use the *tsmnodename* variable to refer to the Tivoli Storage Manager node name that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

You can store the node name in the Tivoli Storage Manager options file (dsm.opt). This parameter overrides the value in the Tivoli Storage Manager options file if **PASSWORDACCESS** is set to PROMPT. This parameter is not valid when **PASSWORDACCESS** is set to GENERATE in the options file.

/TSMOPTFile=*tsmoptfilename*

Use the *tsmoptfilename* variable to identify the Tivoli Storage Manager options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Tivoli Storage FlashCopy Manager is installed is searched.

If the *tsmoptfilename* variable includes spaces, enclose the entire **/tsmoptfile** parameter entry in double quotation marks. For example:

```
/TSMOPTFile="c:\Program Files\file.opt"
```

The default is dsm.opt.

/TSMPassword=_tsmpassword_

> Use the _tsmpassword_ variable to refer to the Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.
>
> If you specified PASSWORDACCESS GENERATE in the Tivoli Storage FlashCopy Manager options file (dsm.opt), supplying the password is not necessary here because the one that is stored in the registry is used. However, to store the password in the registry, you must specify the Tivoli Storage Manager password the first time Tivoli Storage FlashCopy Manager connects to the Tivoli Storage Manager server.
>
> If you do specify a password with this parameter when PASSWORDACCESS GENERATE is in effect, the command-line value is ignored unless the password for this node is not yet stored in the registry. In that case, the specified password is stored in the registry and used when you run this command.
>
> If PASSWORDACCESS PROMPT is in effect, and you do not specify a password value on the command line, then you are prompted for a password.
>
> The Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Restore examples

These output examples provide a sample of the text, messages, and process status that displays when you use the **restore** command.

In this example, the fcmcli restore K:,L: /INSTANTRestore=No command restores volumes K: and L:. The following output is displayed:

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 4, Release 1, Level 2.0
(C) Copyright IBM Corporation 2009, 2015. All rights reserved.


You have selected a full filesystem RESTORE operation. Performing this restore
will overwrite the volumes that you have specified for restore.

Do you want to continue with the RESTORE operation? (Yes (Y)/No (N)) y


Preparing for a RESTORE operation, please wait...

Starting restore of volume...


Beginning VSS restore of 'K:', 'L:'. This operation could take a while, please wait...


Restoring 'K:', 'L:' via file-level copy from snapshot(s). This process may take
 some time. Please wait.


VSS Restore operation completed with rc = 0.

Elapsed Processing Time: 385.23 seconds
```

In this example, the fcmcli restore D:\mnt\mp1,D:\mnt\mp2 /PITDATE=10/07/2014 /PITTIME=08:53:36 command restores mount points D:\mnt\mp1 and ,D:\mnt\mp2. The following output is displayed:

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 4, Release 1, Level 2.0
(C) Copyright IBM Corporation 2009, 2015. All rights reserved.


You have selected a full filesystem RESTORE operation. Performing this restore
will overwrite the volumes that you have specified for restore.

Do you want to continue with the RESTORE operation? (Yes (Y)/No (N)) y


Preparing for a RESTORE operation, please wait...

Starting restore of volume...


Beginning VSS restore of 'd:\mnt\mp1', 'd:\mnt\mp2'. This operation could take a
while, please wait...


Restoring 'd:\mnt\mp1', 'd:\mnt\mp2' via volume-level copy from snapshot(s). This
process may take some time. Please wait.


VSS Restore operation completed with rc = 0.

Elapsed Processing Time: 162.23 seconds
```

In this example, the `fcmcli restore K:,L: /FROMSERVER=troyvm1` command
restores volumes K: and L: from server troyvm1. The following output is
displayed:

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 4, Release 1, Level 2.0
(C) Copyright IBM Corporation 2009, 2015. All rights reserved.


You have selected a full filesystem RESTORE operation. Performing this restore
will overwrite the volumes that you have specified for restore.

Do you want to continue with the RESTORE operation? (Yes (Y)/No (N)) y


Preparing for a RESTORE operation, please wait...

Starting restore of volume...


Beginning VSS restore of 'K:', 'L:'. This operation could take a while, please wait...


Restoring 'K:', 'L:' via volume-level copy from snapshot(s). This process may take
some time. Please wait.


VSS Restore operation completed with rc = 0.

Elapsed Processing Time: 161.57 seconds
```

Unmount backup command

Use the **unmount backup** command to unmount backups that were previously mounted, and are managed by Tivoli Storage FlashCopy Manager or Tivoli Storage Manager.

Unmount backup syntax

Use the **unmount backup** command syntax diagrams as a reference to view available options and truncation requirements.

FCMCLI command

```
>>--FCMCLI--UNMOUNT BACKup----volume name list--------------------------->

>--+-----------------------------+--+--------------------------+-->
   |            +-fcmcfg.xml-+    |  |          +-fcm.log-----+ |
   '-/CONFIGfile=+------------+---'  '-/LOGFile=+-------------+-'
                 '-configfilename-'            '-logfilename-'

>--/LOGPrune=--+-60------+--+---------------------+------------------->
              |-numdays-|  |         +-latest-+   |
              '-No------'  '-/PITDate=+--------+---'
                                     '-date--'

>--+--------------------------+--+-----------------------------------+-->
   |         +-latest-+       |  '-/REMOTECOMPUTER=--computername----'
   '-/PITTime=+--------+------'
             '-time--'

>--+-----------------------------+--+-------------------------------------+-->
   '-/REMOTECOMPUTERUser=--user--'  '-/REMOTECOMPUTERPassword=--passwd---'

>--+-------------------------------+--+----------------------------+-->
   '-/TSMNODe=--tsmnodename--------'  |        +-dsm.opt--------+  |
                                      '-/TSMOPTFile=+----------+--'
                                                   '-tsmoptfilename-'

>--+----------------------------------+--><
   '-/TSMPassword=--tsmpassword-------'
```
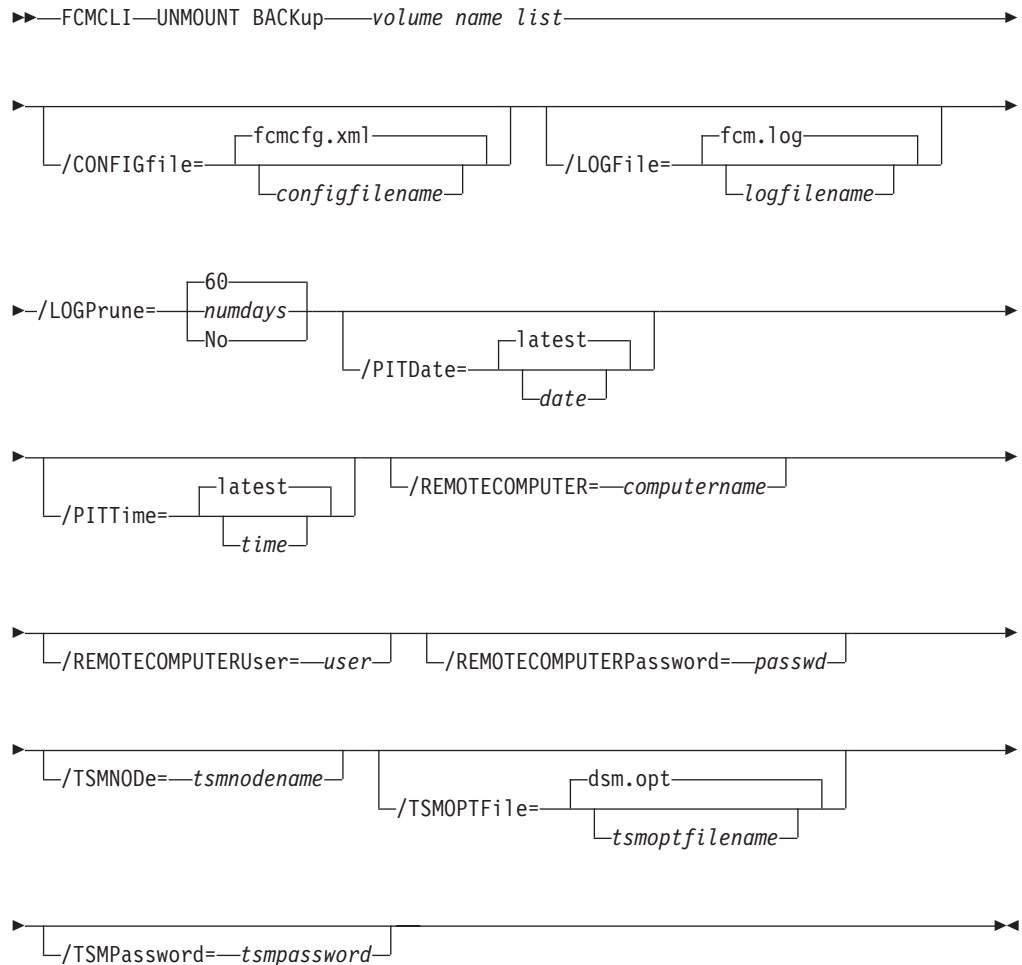
Unmount backup positional parameter

The positional parameter immediately follows the **unmount backup** command and precedes the optional parameters.

volume name list
> Use this parameter to specify a drive letter (for example, a:) or list of mount point directories to unmount. The *volume name list* parameter is required.
>
> To specify more than one name, separate them by commas.

Unmount backup optional parameters

Optional parameters follow the **unmount backup** command and positional
parameters.

/CONFIGfile=*configfilename*

> Use the **/configfile** parameter to specify the name (*configfilename*) of the
> Tivoli Storage FlashCopy Manager configuration file that contains the
> values to use for an **unmount backup** operation.
>
> The *configfilename* variable can include a fully qualified path. If the
> *configfilename* variable does not include a path, the Tivoli Storage
> FlashCopy Manager installation directory is used. If the **/configfile**
> parameter is not specified, or if the *configfilename* variable is not specified,
> the default value is fcmcfg.xml.
>
> If the *configfilename* variable includes spaces, enclose the entire **/configfile**
> parameter entry in double quotation marks. For example:
>
> /CONFIGfile="c:\Program Files\fcmcfg.xml"

/LOGFile=*logfilename*

> Use the **/logfile** parameter to specify the name of the activity log file that
> is generated by Tivoli Storage FlashCopy Manager. The *logfilename* variable
> identifies the name of the activity log file.
>
> If the specified log file does not exist, a new log file is created. If the
> specified log file exists, new log entries are appended to the file. The
> *logfilename* variable can include a fully qualified path. However, if no path
> is specified, the log file is written to the Tivoli Storage FlashCopy Manager
> installation directory.
>
> If the *logfilename* variable includes spaces, enclose the entire **/logfile**
> parameter entry in double quotation marks. For example:
>
> /LOGFile="c:\Program Files\myfcm.log"
>
> If the **/logfile** parameter is not specified, log records are written to the
> default log file, fcm.log.
>
> The **/logfile** parameter cannot be turned off, logging always occurs.

/LOGPrune=*numdays* | **No**

> When you prune log data, you can discard some of the generated logs
> according to detailed filtering criteria that you set. Depending on the
> option that you set for the **/LOGPrune** parameter, a certain number of days
> of data are saved. By default, *60* days of log entries are saved. The option
> No can be entered to disable log pruning.
>
> Regardless of the option that you set for this parameter, you can explicitly
> request log pruning at any time.
>
> Considerations:
> * For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in
>   the activity log file except for the current command entries.
> * If you specify no, the log file is not pruned.
> * If you do not specify **/LOGPrune**, the default value is that specified by the
>   **logprune** configurable option in the configuration file. The default value
>   is *60*.
> * If you specify **/LOGPrune**, its value is used instead of the value that is
>   stored in the configuration file. Specifying this parameter does not
>   change the value in the configuration file.

- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case, the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can result in an unwanted pruning of the log file. If you are running a command that might prune the log file, and the value of the **TIMEformat** or **DATEformat** parameter is changed, complete one of the following to prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

/PITDAte=*date*

Use the **/pitdate** parameter with the **/pittime** parameter to establish a point in time for which you want to mount the latest version of your backups. Backups that were backed up on or before the date and time you specified, and, which were not deleted before the date and time you specified, are processed. Backup versions that you create after this date and time are ignored. Specify the appropriate date in the *date* variable; use the same format that you selected with the DATEFORMAT option in the Tivoli Storage FlashCopy Manager options file.

If neither *date* nor *time* is specified, then no date and time are established. By default the backup is mounted from the most recent available backup.

If either *date* or *time* is specified, then the backup is mounted from the earliest backup that is selected after the established mount date and time. If no backup after the established date and time is found, by default the backup is mounted from the most recent available backup.

Notes:

- If you specify both *date* and *time*, this selection establishes the mount backup period.
- If you specify *date* and you do not specify *time*, *time* defaults to a value of 23:59:59. This selection establishes the *date* at the specified date.
- If you specify *time* without *date*, then *date* defaults to the current date. This selection establishes the mount date and time as the current date at the specified *time*.

/PITTime=*time*

Use the **/pittime** parameter with the **/pitdate** option to establish a point in time for which you want to mount the latest version of your backups. Files or images that were backed up on or before the date and time you specify, and that were not deleted before the date and time you specify, are processed. Backup versions that you create after this date and time are ignored. This option is ignored if you do not specify the **/pitdate** parameter. Specify the appropriate time in the *time* variable; use the same format that you selected with the TIMEFORMAT option in the Tivoli Storage FlashCopy Manager options file.

If neither *date* nor *time* is specified, then no date and time are established. By default the backup is mounted from the most recent available backup.

If either *date* or *time* is specified, then the backup is mounted from the earliest backup that is selected after the established mount date and time. If no backup after the established date and time is found, by default the backup is mounted from the most recent available backup.

Notes:

- If you specify both *date* and *time*, this selection establishes the mount backup period.
- If you specify *date* and you do not specify *time*, *time* defaults to a value of 23:59:59. This selection establishes the *date* at the specified date.
- If you specify *time* without *date*, then *date* defaults to the current date. This selection establishes the mount date and time as the current date at the specified *time*.

/REMOTECOMPUTER=*computername*

Enter the computer name or IP address of the remote system where the backup was created.

/REMOTECOMPUTERUser=*user*

Enter the user name that is used to log on to the server specified with the **REMOTECOMPUTER** parameter. If a domain is required to log on with the domain account, enter *Domain\User*. To log on to the local account, the domain is not required. There is no default value.

/REMOTECOMPUTERPassword=*passwd*

Enter the password for the user name that is specified with the **REMOTECOMPUTERUser** parameter. There is no default value.

/TSMNODe=*tsmnodename*

Use the *tsmnodename* variable to refer to the Tivoli Storage Manager node name that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

You can store the node name in the Tivoli Storage Manager options file (dsm.opt). This parameter overrides the value in the Tivoli Storage Manager options file if **PASSWORDACCESS** is set to PROMPT. This parameter is not valid when **PASSWORDACCESS** is set to GENERATE in the options file.

/TSMOPTFile=*tsmoptfilename*

Use the *tsmoptfilename* variable to identify the Tivoli Storage Manager options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Tivoli Storage FlashCopy Manager is installed is searched.

If the *tsmoptfilename* variable includes spaces, enclose the entire **/tsmoptfile** parameter entry in double quotation marks. For example:

```
/TSMOPTFile="c:\Program Files\file.opt"
```

The default is dsm.opt.

/TSMPassword=*tsmpassword*

Use the *tsmpassword* variable to refer to the Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server.

If you specified PASSWORDACCESS GENERATE in the Tivoli Storage FlashCopy Manager options file (dsm.opt), supplying the password is not necessary here because the one that is stored in the registry is used. However, to store the password in the registry, you must specify the Tivoli Storage Manager password the first time Tivoli Storage FlashCopy Manager connects to the Tivoli Storage Manager server.

If you do specify a password with this parameter when PASSWORDACCESS GENERATE is in effect, the command-line value is ignored unless the

password for this node is not yet stored in the registry. In that case, the specified password is stored in the registry and used when you run this command.

If PASSWORDACCESS PROMPT is in effect, and you do not specify a password value on the command line, then you are prompted for a password.

The Tivoli Storage Manager password that Tivoli Storage FlashCopy Manager uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Unmount backup example

This output example provides a sample of the text, messages, and process status that displays when you use the **unmount backup** command.

In this example, the `fcmcli unmount backup M:,N:` command unmounts mount points M: and N: The following output is displayed:

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 4, Release 1, Level 2.0
(C) Copyright IBM Corporation 2009, 2015. All rights reserved.

Preparing for a UNMOUNT BACKUP operation, please wait...

Connecting to FCM Server as node 'TROYVM1_FS'...
Connecting to Local DSM Agent 'TROYVM1'...

Backup(s) to be unmounted:
M:
N:


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

Update config command

Use the **update config** command to set the Tivoli Storage FlashCopy Manager or Tivoli Storage Manager configuration parameters in a configuration file.

The values that you set are saved in a Tivoli Storage FlashCopy Manager configuration file. The default configuration file is `fcmcfg.xml`. Configuration values can also be set in the Properties window in Microsoft Management Console (MMC).

For command invocations other than this command, the value of a configuration parameter that is specified in a command overrides the value of the configuration parameter that is specified in the Tivoli Storage FlashCopy Manager configuration file. If, when you use this command, you do not override a value for the configuration file parameter, the values in the default configuration file are used.

Update config syntax

Use the **update config** command syntax diagrams as a reference to view available options and truncation requirements.

FCMCLI command

```
►►──FCMCLI──UPDATE CONFig──────────────────────────────────────────────►
                          └─DATEformat=──dateformatnum─┘


                                          ┌─No──┐
►──IMPORTVSSSNAPSHOTSONLYWhenneeded=───────┼─Yes─┤─────────────────────────►
                                          └─────┘  └─LANGuage=──language─┘


►──────────────────────────────────────────────────────────────────────►
  └─LOCALDSMAgentnode=──nodename─┘  └─LOGFile=──logfilename─┘


►──────────────────────────────────────────────────────────────────────►
            ┌─numdays─┐
  └─LOGPrune=─┼─NO──────┤──┘  └─REMOTEDSMAgentnode=──remote_node─┘


               ┌─1 HH:MM:SS──────┐
►──TIMEformat=──┼─2 HH,MM,SS──────┤──────────────────────────────────────►
               ├─3 HH.MM.SS──────┤                ┌─fcmcfg.xml──────┐
               └─4 HH:MM:SSA/P───┘  └─/CONFIGfile=─┼─────────────────┤─┘
                                                  └─configfilename─┘


►──────────────────────────────────────────────────────────────────►◄
  └─/PRESNapshotcmd=──cmdstring─┘  └─/POSTSNapshotcmd=──cmdstring─┘
```

Update config positional parameters

Positional parameters immediately follow the **update config** command and precede the optional parameters.

The following positional parameters specify the values in the Tivoli Storage FlashCopy Manager configuration file. You can set only one value for each **update config** command run:

DATEformat=_dateformatnum_

Use the **DATEformat** positional parameter to select the format you want to use to display dates.

The _dateformatnum_ variable displays the date in one of the following formats. Select the format number that corresponds to the format you want to use.

1   MM/DD/YYYY. This format is the default.

2   DD-MM-YYYY

3   YYYY-MM-DD

4   DD.MM.YYYY

5   YYYY.MM.DD

6   YYYY/MM/DD

7   DD/MM/YYYY

Changes to the value of the **dateformat** parameter can result in an undesired pruning of the Tivoli Storage FlashCopy Manager log file (`fcm.log` by default). You can avoid losing existing log file data by doing one of the following actions:

- After you change the value of the **dateformat** parameter, make a copy of the existing log file before you run Tivoli Storage FlashCopy Manager.
- Specify a new log file with the **/logfile** parameter.

IMPORTVSSSNAPSHOTSONLYWhenneeded=Yes | No

By default, the parameter is set to `No`. This default setting means that local persistent VSS snapshots are automatically imported to the Windows system where the snapshots are created. By importing the VSS snapshots only when needed, the snapshots are imported to a host for FlashCopy Manager operations. To not automatically import local persistent snapshots to the Windows system where the snapshots are created, set the parameter to `Yes`.

LANGuage=*language*

Specify the three-character code of the language you want to use to display messages:

CHS   Simplified Chinese

CHT   Traditional Chinese

DEU   Standard German

ENU   American English (This option is the default.)

ESP   Standard Spanish

FRA   Standard French

ITA   Standard Italian

JPN   Japanese

KOR   Korean

PTB   Brazilian Portuguese

LOCALDSMAgentnode=*nodename*

Specify the node name of the local system that runs the VSS backups. This positional parameter must be specified for VSS operations to be performed.

LOGFile=*logfilename*

Use the **LOGFile** positional parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager. The Tivoli Storage FlashCopy Manager activity log records significant events, such as completed commands and error messages.

The *logfilename* variable identifies the name of the activity log file. If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The *logfilename* variable can include a fully qualified path. However, if no path is specified, the log file is assigned to the Tivoli Storage FlashCopy Manager installation directory.

/LOGPrune=*numdays*|**No**

When you prune log data, you can discard some of the generated logs according to detailed filtering criteria that you set. Depending on the option that you set for the **/LOGPrune** parameter, a certain number of days

of data are saved. By default, *60* days of log entries are saved. The option
`No` can be entered to disable log pruning.

Regardless of the option that you set for this parameter, you can explicitly
request log pruning at any time.

Considerations:

- For *numdays*, the range is *0* to *9999*. A value of *0* deletes all entries in
  the activity log file except for the current command entries.
- If you specify `no`, the log file is not pruned.
- If you do not specify **/LOGPrune**, the default value is that specified by the
  logprune configurable option in the configuration file. The default value
  is *60*.
- If you specify **/LOGPrune**, its value is used instead of the value that is
  stored in the configuration file. Specifying this parameter does not
  change the value in the configuration file.
- You can specify **/LOGPrune** without specifying *numdays* or *no*; in this case,
  the default value, *60*, is used.
- Changes to the value of the **TIMEformat** or **DATEformat** parameter can
  result in an unwanted pruning of the log file. If you are running a
  command that might prune the log file, and the value of the **TIMEformat**
  or **DATEformat** parameter is changed, complete one of the following to
  prevent unintentional pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the **/LOGFile** parameter or **logfile** setting.

NUMberformat=*fmtnum*
> Use the **NUMberformat** positional parameter to specify the format you want
> to use to display numbers.
>
> The *fmtnum* variable displays numbers by using one of the following
> formats. Select the format number that corresponds to the format you want
> to use.
>
> **1**   n,nnn.dd. This format is the default.
>
> **2**   n,nnn,dd.
>
> **3**   n nnn,dd
>
> **4**   n nnn.dd
>
> **5**   n.nnn,dd
>
> **6**   n'nnn,dd

REMOTEDSMAgentnode=*remote_node*
> Specifies the remote client node that runs the VSS offloaded backups on a
> remote computer.

TIMEformat=*formatnumber*
> Use the **TIMEformat** positional parameter to specify the format in which
> you want to display the system time.
>
> The *formatnumber* variable displays time in one of the following formats.
> Select the format number that corresponds to the format you want to use.
>
> **1**   HH:MM:SS This is the default.
>
> **2**   HH,MM,SS
>
> **3**   HH.MM.SS

| 4 | HH:MM:SSA/P |

Update config optional parameters

Optional parameters follow the **update config** command and positional parameters.

/CONFIGfile=*configfilename*

Use the **/configfile** parameter to specify the name (*configfilename*) of the Tivoli Storage FlashCopy Manager configuration file that contains the values to use for an **update config** operation.

The *configfilename* variable can include a fully qualified path. If the *configfilename* variable does not include a path, the Tivoli Storage FlashCopy Manager installation directory is used. If the **/configfile** parameter is not specified, or if the *configfilename* variable is not specified, the default value is fcmcfg.xml.

If the *configfilename* variable includes spaces, enclose the entire **/configfile** parameter entry in double quotation marks. For example:

```
/CONFIGfile="c:\Program Files\fcmcfg.xml"
```

/PRESNapshotcmd=*cmdstring*

The **/presnapshotcmd** parameter runs a command or script before a snapshot operation begins. You can use this optional parameter to quiesce an application before a snapshot is created. You can then restart the application after the snapshot is started by using the **/postsnapshotcmd** optional parameter. The *cmdstring* variable specifies the command to run before the snapshot operation begins. You must specify the fully qualified path name for the command script.

/POSTSNapshotcmd=*cmdstring*

The **/postsnapshotcmd** parameter runs a command or script after a snapshot operation ends. You can use this optional parameter to resume the application after the snapshot is created. This parameter is used with the **/presnapshotcmd** parameter. The *cmdstring* variable must be a fully qualified path.

Update config example

This output example provides a sample of the text, messages, and process status that displays when you use the **update config** command.

The **fcmcli update config localdsmagentnode=server12** command sets the node name server12 as the local system that performs the VSS backups. An example of the output is provided:

```
FMX5054I The preference has been set successfully.
```

The **fcmcli update config numberformat=2** command specifies that the 2 format is used to display numbers (n,nnn,dd.). An example of the output is provided:

```
FMX5054I The preference has been set successfully.
```

The **fcmcli update config localdsmagentnode=server44 /configfile=fcmcfg_server44.xml** command sets the node name server44 as the local system that performs the VSS backups. This command also specifies that Tivoli Storage FlashCopy Manager operations use the settings in the fcmcfg_server44.xml configuration file. An example of the output is provided:

```
FMX5054I The preference has been set successfully.
```

VSS policy commands

Use VSS policy commands to manage VSS policy binding statements.

UPDATE VSSPolicy

This command is used to update an existing VSS policy binding statement.

FCMCLI command: UPDATE VSSpolicy
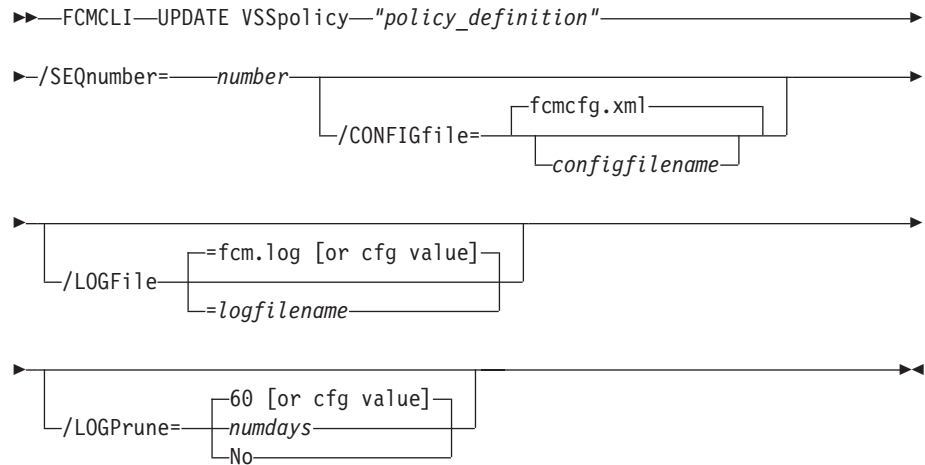
```
►►──FCMCLI──UPDATE VSSpolicy──"policy_definition"─────────────────────────►

►─/SEQnumber=──number──────────────────────────────────────────────────────►
                        └─/CONFIGfile=─┬──────fcmcfg.xml──────┬─┘
                                       └──configfilename──┘

►──────────────────────────────────────────────────────────────────────────►
    └─/LOGFile─┬──=fcm.log [or cfg value]─┐
               └──=logfilename────────────┘

►──────────────────────────────────────────────────────────────────────────►◄
    └─/LOGPrune=──┬──60 [or cfg value]──┐
                  ├──numdays────────────┤
                  └──No─────────────────┘
```

Parameters:
- *policy_definition*: Specifies the name of the VSS policy binding statement that is being updated.
- `SEQnumber`: Specifies the sequence priority for the updated policy binding statement.
- `CONFIGfile`: Specify the name (*configfilename*) of the Tivoli Storage FlashCopy Manager configuration file that contains the values to use with the **update vsspolicy** command.
- `LOGFile`: Specify the name (*logfilename*) of the activity log file to use with the **update vsspolicy** command.
- `LOGPrune`: Specify whether to disable log pruning or to prune the log for one command run. By default, log pruning occurs daily. The *numdays* variable represents the number of days to save log entries. By default, `60` days of log entries are saved in the pruning process.

INSert VSSpolicy

This command inserts a new VSS policy binding statement at the position that is specified by the **/SEQnumber** parameter.

FCMCLI command: INSert VSSpolicy

```
►►──FCMCLI──INSert VSSpolicy──"policy_definition"─────────────────────────►
```
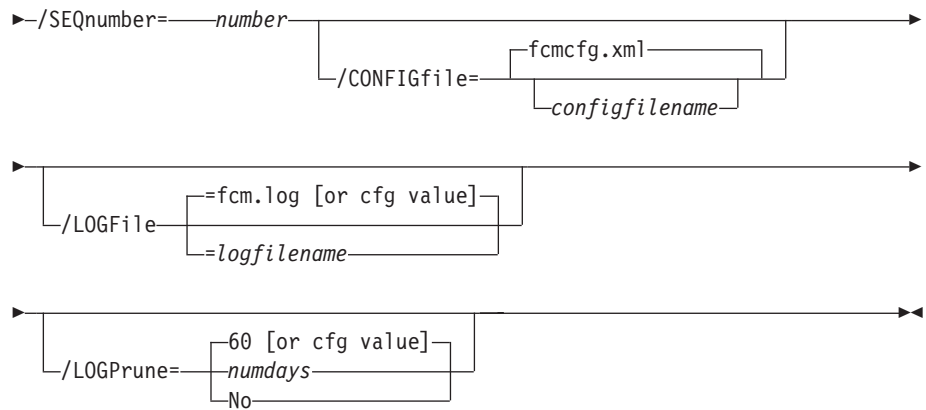
```
►►─/SEQnumber=──number──────────────────────────────────────────────────►
            │                    ┌─fcmcfg.xml──────┐    │
            └─/CONFIGfile=───────┤                 ├────┘
                                 └─configfilename──┘


►──────────────────────────────────────────────────────────────────────►
      │            ┌─=fcm.log [or cfg value]─┐   │
      └─/LOGFile───┤                         ├───┘
                   └─=logfilename────────────┘


►──────────────────────────────────────────────────────────────────────►◄
      │              ┌─60 [or cfg value]─┐   │
      └─/LOGPrune=───┤─numdays───────────├───┘
                     └─No────────────────┘
```

Parameters:

- *policy_definition*: Specifies the name of the VSS policy binding statement that is being updated.
- **SEQnumber**: Specifies the sequence priority of the inserted policy binding statement.

  The default value is the sequence value of the highest prioritized VSS policy in the Tivoli Storage FlashCopy Manager configuration file (fcmcfg.xml).
- **CONFIGfile**: Specify the name (*configfilename*) of the Tivoli Storage FlashCopy Manager configuration file that contains the values to use with the **insert vsspolicy** command.
- **LOGFile**: Specify the name (*logfilename*) of the activity log file to use with the **insert vsspolicy** command.
- **LOGPrune**: Specify whether to disable log pruning or to prune the log for one command run. By default, log pruning occurs daily. The *numdays* variable represents the number of days to save log entries. By default, 60 days of log entries are saved in the pruning process.

DELete VSSpolicy

This command is used to delete a VSS policy binding statement at the position that is specified by the **/SEQnumber** parameter.

FCMCLI command: DELete VSSpolicy

```
►►──FCMCLI──DELete VSSpolicy──/SEQnumber=──────number────────────────────►


►──────────────────────────────────────────────────────────────────────►
      │                    ┌─fcmcfg.xml──────┐    │
      └─/CONFIGfile=───────┤                 ├────┘
                           └─configfilename──┘


►──────────────────────────────────────────────────────────────────────►
      │            ┌─=fcm.log [or cfg value]─┐   │
      └─/LOGFile───┤                         ├───┘
                   └─=logfilename────────────┘


►──────────────────────────────────────────────────────────────────────►◄
      │              ┌─60 [or cfg value]─┐   │
      └─/LOGPrune=───┤─numdays───────────├───┘
                     └─No────────────────┘
```
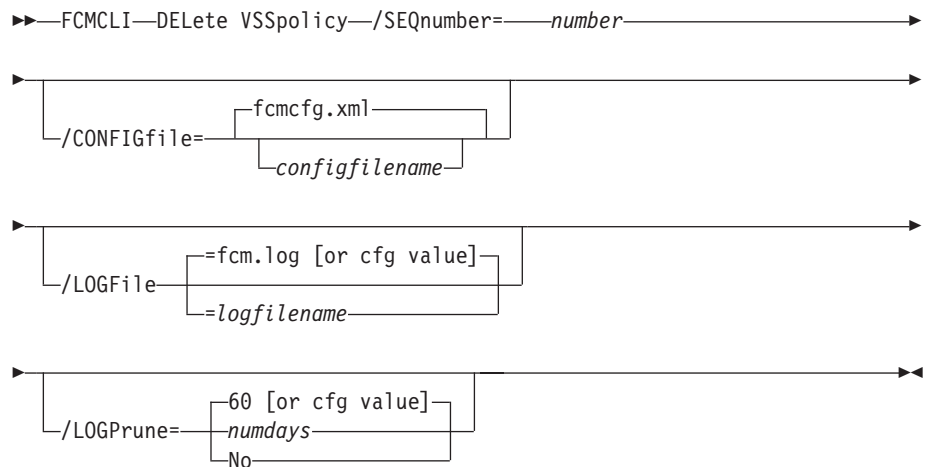
Parameters:
- **SEQnumber**: Specifies the sequence priority for the policy binding statement to delete.
- **CONFIGfile**: Specify the name (*configfilename*) of the Tivoli Storage FlashCopy Manager configuration file that contains the values to use with the **delete vsspolicy** command.
- **LOGFile**: Specify the name (*logfilename*) of the activity log file to use with the **delete vsspolicy** command.
- **LOGPrune** Specify whether to disable log pruning or to prune the log for one command run. By default, log pruning occurs daily. The *numdays* variable represents the number of days to save log entries. By default, 60 days of log entries are saved in the pruning process.

Query VSSpolicy

This command is used to show the VSS policy binding statements in the configuration file.

FCMCLI command: Query VSSpolicy

```
►►─FCMCLI─Query VSSpolicy──────────────────────────────────────►

                         ┌─fcmcfg.xml──────┐
     └─/CONFIGfile=──┴─configfilename─┘──┘

►──────────────────────────────────────────────────────────────►

              ┌─=fcm.log [or cfg value]─┐
     └─/LOGFile──┴─=logfilename───────────┘

►──────────────────────────────────────────────────────────────►◄

              ┌─60 [or cfg value]─┐
     └─/LOGPrune=──┼─numdays──────────┤
                  └─No───────────────┘
```
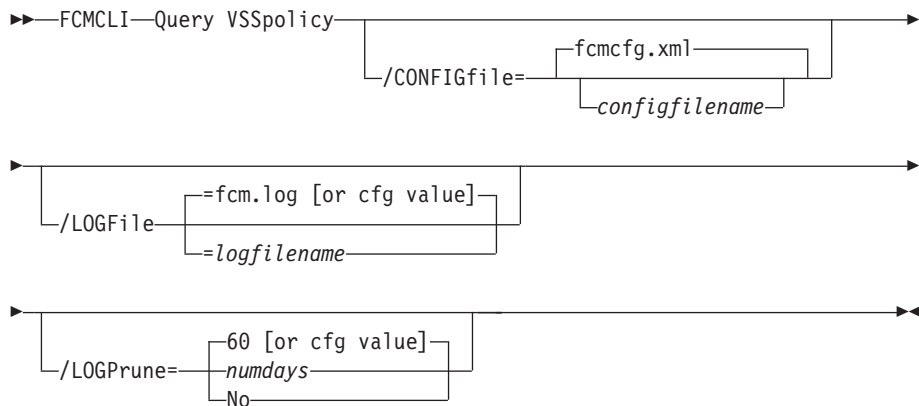
Parameters:
- **CONFIGfile**: Specify the name (*configfilename*) of the Tivoli Storage FlashCopy Manager configuration file to show.
- **LOGFile**: Specify the name (*logfilename*) of the activity log file to use with the **query vsspolicy** command.
- **LOGPrune**: Specify whether to disable log pruning or to prune the log for one command run. By default, log pruning occurs daily. The *numdays* variable represents the number of days to save log entries. By default, 60 days of log entries are saved in the pruning process.

VSS policy command examples
The following output examples provide a sample of the text, messages, and process status that displays when you use the VSS policy commands.

In this example, the **fcmcli update vsspolicy "* * FULL LOCAL STANDARD" /SEQnumber=2** command updates the default VSS policy binding statement at sequence priority 2. The following output is displayed:
```
UPDATE VSSpolicy was successful.
```

In this example, the **fcmcli insert vsspolicy "* * FULL LOCAL STANDARD"
/SEQnumber=2** command inserts the default VSS policy binding statement at
sequence priority 2. The following output is displayed:

```
INSERT VSSpolicy was successful.
```

In this example, the **fcmcli delete vsspolicy /SEQnumber=1** command deletes the
VSS policy binding statement at sequence priority 1. The following output is
displayed:

```
DELETE VSSpolicy was successful.
```

In this example, the **fcmcli query vsspolicy /configfile=fcmcfg_server44.xml**
command queries the VSS policy binding statements in the fcmcfg_server44.xml
configuration file. The following output is displayed:

```
FCM for Windows VSS Policy

VSS policy statements are processed from the bottom up and processing
stops at the first match. To ensure that more specific specifications
are processed at all, the more general specification should be listed
before the more specific ones, so as to be processed after the more
specific specifications. Otherwise, the more general specification will
match the target before the more specific specifications are seen.

---------------------------------------------------

Sequence Number ........................ 1
Server ................................. SERVER44
Component .............................. C:
Backup Type ............................ FULL
Backup Destination ..................... LOCAL
Management Class ....................... STANDARD
```

Appendix. 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 (http://www.ibm.com/support/knowledgecenter/SSGSG7_7.1.2/com.ibm.itsm.ic.doc/glossary.html).

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