IBM Tivoli Storage FlashCopy Manager
Version 3.1

Installation and User's Guide for Windows

SC27-4006-00

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Note
Before using this information and the product it supports, read the information in "Notices" on page 251.

This edition applies to Version 3.1 of IBM Tivoli Storage FlashCopy Manager for Windows (product numbers 5608-W07, 5641-A06, and 5724-X94) and to all subsequent releases and modifications until otherwise indicated in new editions.

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Preface

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

Throughout this document, the terms *Windows Server* and *Windows Server 2003 and later* refer to the following operating systems:

- Windows Server 2003
- Windows Server 2003 R2
- Windows Server 2008
- Windows Server 2008 R2

Throughout this document, the term *Exchange Server* (unless otherwise specified) refers to the following products:

- Exchange Server 2007
- Exchange Server 2010

Throughout this document, the term *SQL Server* (unless otherwise specified) refers to the following products:

- SQL Server 2005
- SQL Server 2008
- SQL Server 2008 R2

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

Changes since the previous edition 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 a database server environments.

It is assumed that you have an understanding of the following storage systems, operating systems, or applications as applicable:

- The IBM storage system that is used for the database:
  - IBM System Storage® DS3000, DS4000®, DS5000
  - IBM System Storage SAN Volume Controller
  - IBM Storwize® V7000
  - IBM XIV® Storage System
  - IBM System Storage DS8000™ (DS8100, DS8300, or DS8700)
  - Any storage devices that implement the VSS provider interface. See "VSS Service" on page 5 for more information.
- Windows operating system
- Microsoft Volume Shadow Copy Service (VSS)
- One of these server applications:

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– Microsoft Exchange Server
– Microsoft SQL Server

Publications

Publications for the IBM Tivoli Storage Manager family of products are available online. The IBM 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 Tivoli.

To search all publications, go to the Tivoli Storage Manager information center at http://publib.boulder.ibm.com/infocenter/tsminfo/v6r3.

You can download PDF versions of publications from the Tivoli Storage Manager information center or from the IBM Publications Center at http://www.ibm.com/shop/publications/order/.

Go to Tivoli Documentation Central to find information centers that contain official product documentation for current and previous versions of Tivoli products, including the Tivoli Storage Manager product family. You can find Tivoli Documentation Central at https://www.ibm.com/developerworks/wikis/display/tivolidoccentral/Home.

You can also order some related publications from the IBM Publications Center website. The website provides information about ordering publications from countries other than the United States. In the United States, you can order publications by calling 1-800-879-2755.

Tivoli Storage FlashCopy Manager publications

The following table lists the publications that make up the Tivoli Storage FlashCopy Manager library.

Table 1. Tivoli Storage FlashCopy Manager publications

Publication title	Order number
IBM Tivoli Storage FlashCopy Manager for UNIX and Linux Installation and User's Guide	SC27-4005
IBM Tivoli Storage FlashCopy Manager for Windows Installation and User's Guide	SC27-4006
IBM Tivoli Storage FlashCopy Manager for VMware Installation and User's Guide	SC27-4007
IBM Tivoli Storage FlashCopy Manager Messages	GC27-4008

Tivoli Storage Manager publications

The following tables list the publications that make up the Tivoli Storage Manager library.

Table 2. Tivoli Storage Manager server publications

Publication title	Order number
IBM Tivoli Storage Manager for AIX Installation Guide	GC23-9781
IBM Tivoli Storage Manager for AIX Administrator's Guide	SC23-9769
IBM Tivoli Storage Manager for AIX Administrator's Reference	SC23-9775
IBM Tivoli Storage Manager for HP-UX Installation Guide	GC23-9782
IBM Tivoli Storage Manager for HP-UX Administrator's Guide	SC23-9770
IBM Tivoli Storage Manager for HP-UX Administrator's Reference	SC23-9776
IBM Tivoli Storage Manager for Linux Installation Guide	GC23-9783
IBM Tivoli Storage Manager for Linux Administrator's Guide	SC23-9771
IBM Tivoli Storage Manager for Linux Administrator's Reference	SC23-9777
IBM Tivoli Storage Manager for Oracle Solaris Installation Guide	GC23-9784
IBM Tivoli Storage Manager for Oracle Solaris Administrator's Guide	SC23-9772
IBM Tivoli Storage Manager for Oracle Solaris Administrator's Reference	SC23-9778
IBM Tivoli Storage Manager for Windows Installation Guide	GC23-9785
IBM Tivoli Storage Manager for Windows Administrator's Guide	SC23-9773
IBM Tivoli Storage Manager for Windows Administrator's Reference	SC23-9779
IBM Tivoli Storage Manager for z/OS Media Installation and User's Guide	SC27-4018
IBM Tivoli Storage Manager Upgrade and Migration Guide for V5 Servers	GC27-4017
IBM Tivoli Storage Manager Integration Guide for Tivoli Storage Manager FastBack®	SC27-2828

Table 3. Tivoli Storage Manager storage agent publications

Publication title	Order number
IBM Tivoli Storage Manager for SAN for AIX Storage Agent User's Guide	SC23-9797
IBM Tivoli Storage Manager for SAN for HP-UX Storage Agent User's Guide	SC23-9798
IBM Tivoli Storage Manager for SAN for Linux Storage Agent User's Guide	SC23-9799
IBM Tivoli Storage Manager for SAN for Oracle Solaris Storage Agent User's Guide	SC23-9800
IBM Tivoli Storage Manager for SAN for Windows Storage Agent User's Guide	SC23-9553

Table 4. Tivoli Storage Manager client publications

Publication title	Order number
IBM Tivoli Storage Manager for UNIX and Linux: Backup-Archive Clients Installation and User's Guide	SC23-9791

Table 4. Tivoli Storage Manager client publications (continued)

Publication title	Order number
IBM Tivoli Storage Manager for Windows: Backup-Archive Clients Installation and User's Guide	SC23-9792
IBM Tivoli Storage Manager Using the Application Programming Interface	SC23-9793
IBM Tivoli Storage Manager for Space Management for UNIX and Linux: User's Guide	SC23-9794
IBM Tivoli Storage Manager HSM for Windows Administration Guide	SC23-9795

Table 5. Tivoli Storage Manager data protection publications

Publication title	Order number
IBM Tivoli Storage Manager for Databases: Data Protection for Microsoft SQL Server Installation and User's Guide	GC27-4010
IBM Tivoli Storage Manager for Databases: Data Protection for Oracle for UNIX and Linux Installation and User's Guide	SC27-4019
IBM Tivoli Storage Manager for Databases: Data Protection for Oracle for Windows Installation and User's Guide	SC27-4020
IBM Tivoli Storage Manager for Mail: Data Protection for Microsoft Exchange Server Installation and User's Guide	GC27-4009
IBM Tivoli Storage Manager for Mail: Data Protection for Lotus Domino UNIX and Linux Installation and User's Guide	SC27-4021
IBM Tivoli Storage Manager for Mail: Data Protection for Lotus Domino for Windows Installation and User's Guide	SC27-4022
IBM Tivoli Storage Manager for Enterprise Resource Planning: Data Protection for SAP Installation and User's Guide for DB2	SC33-6341
IBM Tivoli Storage Manager for Enterprise Resource Planning: Data Protection for SAP Installation and User's Guide for Oracle	SC33-6340
IBM Tivoli Storage Manager for Virtual Environments Installation and User's Guide	SC27-2898
IBM Tivoli Storage Manager for Microsoft SharePoint Guide	N/A

Table 6. IBM Tivoli Storage Manager troubleshooting and tuning publications

Publication title	Order number
IBM Tivoli Storage Manager Problem Determination Guide	GC23-9789
IBM Tivoli Storage Manager Performance Tuning Guide	GC23-9788
IBM Tivoli Storage Manager Client Messages and Application Programming Interface Return Codes	SC27-2878
IBM Tivoli Storage Manager Server Messages and Error Codes	SC27-2877
IBM Tivoli Storage Manager for Mail: Data Protection for Microsoft Exchange Server Messages	GC27-4011
IBM Tivoli Storage Manager for Databases: Data Protection for Microsoft SQL Server Messages	GC27-4012
IBM Tivoli Storage Manager for Databases: Data Protection for Oracle Messages	SC27-4014
IBM Tivoli Storage Manager for Mail: Data Protection for Lotus Domino Messages	SC27-4015

Table 6. IBM Tivoli Storage Manager troubleshooting and tuning publications (continued)

Publication title	Order number
IBM Tivoli Storage Manager for Enterprise Resource Planning: Data Protection for SAP Messages	SC27-4016

Note: You can find information about IBM System Storage Archive Manager at http://publib.boulder.ibm.com/infocenter/tsminfo/v6r3/c_complydataretention_ovr.html.

Related hardware publications

These publications are available to assist with using Tivoli Storage FlashCopy Manager.

Title	Order Number
IBM System Storage DS8000 Introduction and Planning Guide	GC35-0515
IBM System Storage DS8000 Messages Reference	GC26-7914
IBM System Storage DS8000 Installation Guide	GC26-7910
IBM XIV® Storage System: Concepts, Architecture, and Usage	SG24-7659
IBM XIV® Storage System (Type: 2810) Model A14 (Gen 2) Introduction and Planning Guide for Customer Configuration	GA52-1327
IBM XIV® Storage System User Manual Version 10.1	GC27-2213
IBM System Storage SAN Volume Controller Planning Guide	GA32-0551
IBM System Storage SAN Volume Controller Hardware Installation Guide	GC27-2132
IBM System Storage SAN Volume Controller Software Installation and Configuration Guide	SC23-6628

Support information

You can find support information for IBM products from various sources.

Start at the IBM Support Portal: http://www.ibm.com/support/entry/portal/. You can select the products that you are interested in and search for a wide variety of relevant information.

Getting technical training

Information about Tivoli technical training courses is available online.

Go to the following websites to sign up for training, ask questions, and interact with others who use IBM storage products.

Tivoli software training and certification
Choose from instructor led, online classroom training, self-paced Web classes, Tivoli certification preparation, and other training options at http://www.ibm.com/software/tivoli/education/

Tivoli Support Technical Exchange
Technical experts share their knowledge and answer your questions in webcasts at http://www.ibm.com/software/sysmgmt/products/support/supp_tech_exch.html.

Storage Management community
Interact with others who use IBM storage management products at http://www.ibm.com/developerworks/servicemanagement/sm/index.html

Global Tivoli User Community
Share information and learn from other Tivoli users throughout the world at http://www.tivoli-ug.org/.

IBM Education Assistant
View short "how to" recordings designed to help you use IBM software products more effectively at http://publib.boulder.ibm.com/infocenter/ieduasst/tivv1r0/index.jsp

Searching knowledge bases

If you have a problem with your Tivoli Storage Manager family product, there are several knowledge bases that you can search.

Begin by searching the Tivoli Storage Manager Information Center at http://publib.boulder.ibm.com/infocenter/tsminfo/v6r3. From this website, you can search the current Tivoli Storage Manager documentation.

Searching the Internet

If you cannot find an answer to your question in the IBM Tivoli Storage Manager information center, search the Internet for the information that might help you resolve your problem.

To search multiple Internet resources, go to the IBM support website at http://www.ibm.com/support/entry/portal/.

You can search for information without signing in. Sign in using your IBM ID and password if you want to customize the site based on your product usage and information needs. If you do not already have an IBM ID and password, click **Sign in** at the top of the page and follow the instructions to register.

From the support website, you can search various resources including:

- IBM technotes
- IBM downloads
- IBM Redbooks® publications
- IBM Authorized Program Analysis Reports (APARs)

Select the product and click **Downloads** to search the APAR list.

If you still cannot find a solution to the problem, you can search forums and newsgroups on the Internet for the latest information that might help you find problem resolution.

An independent user discussion list, ADSM-L, is hosted by Marist College. You can subscribe by sending an email to listserv@vm.marist.edu. The body of the message must contain the following text: `SUBSCRIBE ADSM-L` *your_first_name your_family_name*.

To share your experiences and learn from others in the Tivoli Storage Manager and Tivoli Storage FlashCopy Manager user communities, go to the following wikis:

Tivoli Storage Manager wiki
http://www.ibm.com/developerworks/wikis/display/tivolistoragemanager

Tivoli Storage FlashCopy Manager wiki
https://www.ibm.com/developerworks/mydeveloperworks/wikis/home/wiki/Tivoli Storage FlashCopy Manager

Using IBM Support Assistant

IBM Support Assistant is a complimentary software product that can help you with problem determination. It is available for some Tivoli Storage Manager and Tivoli Storage FlashCopy Manager products.

To learn about which products are supported, go to the IBM Support Assistant download web page at http://www.ibm.com/software/support/isa/download.html.

IBM Support Assistant helps you gather support information when you must open a problem management record (PMR), which you can then use to track the problem. The product-specific plug-in modules provide you with the following resources:

- Support links
- Education links
- Ability to submit problem management reports

You can find more information at the IBM Support Assistant website:

http://www.ibm.com/software/support/isa/

You can also install the stand-alone IBM Support Assistant application on any workstation. You can then enhance the application by installing product-specific plug-in modules for the IBM products that you use. Find add-ons for specific products at http://www.ibm.com/support/docview.wss?uid=swg27012689.

Finding product fixes

A product fix to resolve your problem might be available from the IBM software support website.

You can determine what fixes are available by checking the IBM software support website at http://www.ibm.com/support/entry/portal/.

- If you previously customized the site based on your product usage:
  1. Click the link for your product, or a component for which you want to find a fix.
  2. Click **Downloads**, and then click **Fixes by version**.
- If you have not customized the site based on your product usage, click **Downloads** and search for your product.

Receiving notification of product fixes

You can receive notifications about fixes, flashes, upgrades, and other news about IBM products.

To sign up to receive notifications about IBM products, follow these steps:

1. From the support page at http://www.ibm.com/support/entry/portal/, click **Sign in to create, manage, or view your subscriptions** in the **Notifications** pane.
2. Sign in using your IBM ID and password. If you do not have an ID and password, click **register now** and complete the registration process.
3. Click **Manage all my subscriptions** in the **Notifications** pane.
4. Click the **Subscribe** tab and then click **Tivoli**.
5. Select the products for which you want to receive notifications and click **Continue**.
6. Specify your notification preferences and click **Submit**.

Contacting IBM Software Support

You can contact IBM Software Support if you have an active IBM subscription and support contract and if you are authorized to submit problems to IBM.

To obtain help from IBM Software Support, complete the following steps:

1. Ensure that you have completed the following prerequisites:
   a. Set up a subscription and support contract.
   b. Determine the business impact of your problem.
   c. Describe your problem and gather background information.
2. Follow the instructions in "Submitting the problem to IBM Software Support" on page xv.

Setting up a subscription and support contract

Set up a subscription and support contract. The type of contract that you need depends on the type of product you have.

For IBM distributed software products (including, but not limited to, IBM Tivoli, Lotus®, and Rational® products, as well as IBM DB2® and IBM WebSphere® products that run on Microsoft Windows or on operating systems such as AIX or Linux), enroll in IBM Passport Advantage® in one of the following ways:

- **Online:** Go to the Passport Advantage website at http://www.ibm.com/software/lotus/passportadvantage/, click **How to enroll**, and follow the instructions.
- **By telephone:** You can call 1-800-IBMSERV (1-800-426-7378) in the United States. For the telephone number to call in your country, go to the IBM Software Support Handbook web page at http://www14.software.ibm.com/webapp/set2/sas/f/handbook/home.html and click **Contacts**.

Determining the business impact

When you report a problem to IBM, you are asked to supply a severity level. Therefore, you must understand and assess the business impact of the problem you are reporting.

Severity 1	**Critical** business impact: You are unable to use the program, resulting in a critical impact on operations. This condition requires an immediate solution.
Severity 2	**Significant** business impact: The program is usable but is severely limited.
Severity 3	**Some** business impact: The program is usable with less significant features (not critical to operations) unavailable.
Severity 4	**Minimal** business impact: The problem causes little impact on operations, or a reasonable circumvention to the problem has been implemented.

Describing the problem and gathering background information

When explaining a problem to IBM, it is helpful to be as specific as possible. Include all relevant background information so that IBM Software Support specialists can help you solve the problem efficiently.

To save time, know the answers to these questions:

- What software versions were you running when the problem occurred?
- Do you have logs, traces, and messages that are related to the problem symptoms? IBM Software Support is likely to ask for this information.
- Can the problem be re-created? If so, what steps led to the failure?
- Have any changes been made to the system? For example, hardware, operating system, networking software, and so on.
- Are you using a workaround for this problem? If so, be prepared to explain it when you report the problem.

Submitting the problem to IBM Software Support

You can submit the problem to IBM Software Support online or by telephone.

Online

Go to the IBM Software Support website at http://www.ibm.com/support/entry/portal/Open_service_request/Software/Software_support_(general). Sign in to access IBM Service Requests and enter your information into the problem submission tool.

By telephone

For the telephone number to call in your country, go to the IBM Software Support Handbook at http://www14.software.ibm.com/webapp/set2/sas/f/handbook/home.html and click **Contacts**.

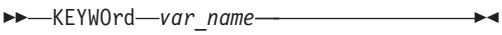
Reading syntax diagrams

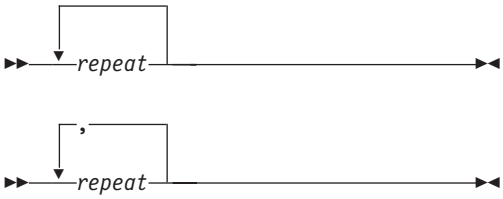
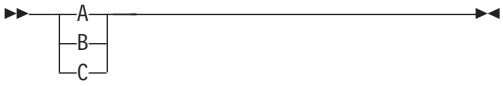
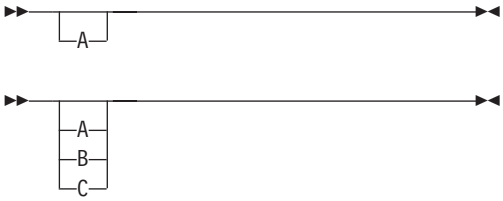
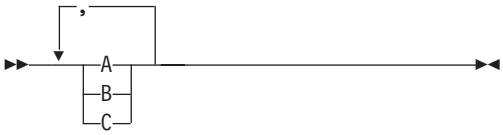
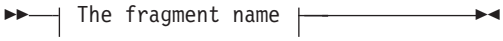
To read a syntax diagram for entering a command, follow the path of the line. Read from left to right and from top to bottom.

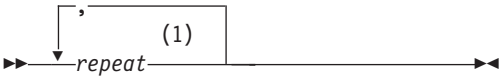
- The ►►— symbol indicates the beginning of a syntax diagram.
- The —► symbol at the end of a line indicates the syntax diagram continues on the next line.
- The ►— symbol at the beginning of a line indicates a syntax diagram continues from the previous line.
- The —►◄ symbol indicates the end of a syntax 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 appears 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.	
Symbols: Enter these symbols exactly as they appear 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.	

Syntax diagram description	Example
Repetition: An arrow returning to the left means you can repeat the item. A character or space within an arrow means you must separate the repeated items with that character or space.	
Required Choices: When two or more items are in a stack and one of them is on the line, you *must* specify one item. In 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. 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.	
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. 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 returning to the left means you can select more than one item or, in some cases, repeat a single item. 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 appears between vertical bars in the diagram. The expanded fragment appears between vertical bars in the diagram after a heading with the same fragment name.	 **The fragment name:**

Syntax diagram description	Example
Footnote: A footnote in the diagram references specific details about the syntax containing the footnote. In this example, the footnote by the arrow references the number of times you can repeat the item.	 **Notes:** 1 Specify *repeat* as many as 5 times.

New in Version 3.1

Tivoli Storage FlashCopy Manager Version 3.1 contains many new features and changes.

Microsoft Management Console (MMC) GUI enhancements

The Microsoft Management Console (MMC) graphical user interface (GUI) has been improved. The following features are available in the new MMC GUI:

- An enhanced backup and restore interface with MMC GUI integration.
- Consolidation of the Tivoli Storage FlashCopy Manager, Data Protection for Microsoft Exchange Server, and Data Protection for Microsoft SQL Server graphical user interfaces into a single MMC GUI.
- Added filtering and refresh options.
- A task manager to process query, backup, and restore operations as individual tasks. Multiple tasks can be submitted simultaneously.
- Enhanced configuration wizards to assist you with setting up Tivoli Storage FlashCopy Manager.
- An integrated interface for configuration properties.
- Dashboard views that provide graphical views of Tivoli Storage FlashCopy Manager activities.
- Local scheduling capabilities such as the schedule mode, in addition to default interactive mode. By using the schedule mode you can schedule operations as easily as interactively issuing the command in the MMC GUI.

Support for Microsoft Exchange Server

The Mailbox Restore browser is available for you to browse and restore individual mailbox items.

Support for Microsoft SQL Server

- Enhanced backup and restore interface
- SQL Server backup compression support

Support for file system and custom applications on Windows

- Backup, restore, mount, and unmount snapshots of file systems and applications not directly supported by Tivoli Storage FlashCopy Manager.
- Policy-based management of snapshots.
- Presnapshot and postsnapshot exits for quiescing and resuming applications.
- Full MMC GUI integration.
- Command-line interface (CLI)

Enhanced Statistics

- The backup and restore statistics have been enhanced to include compression, LAN-free, and client-side deduplication information.
- The **query backup** command has been enhanced to display information regarding backup encryption, compression, and client-side deduplication status.

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Client Scalability
Memory management has been enhanced to process a large numbers of objects.

Restore VSS backups to flat files
Use the **restorefiles** command to restore VSS backups to flat files without interacting with the SQL or Exchange Servers.

Chapter 1. Overview

Overview information about IBM Tivoli Storage FlashCopy Manager is provided in this topic.

Current business practices demand that application servers must be continuously available. Critical data must be protected and readily accessible for quick restore operations. Because of the ever increasing amount of data requiring protection, the time needed to complete traditional file-level backups is no longer available in many information technology environments. As a result, administrators are looking for a solution that protects critical data in a way that also minimizes the downtime associated with necessary backup operations. Tivoli Storage FlashCopy Manager provides this solution.

Tivoli Storage FlashCopy Manager also provides the tools and information needed to create and manage volume-level snapshots of Microsoft SQL Server and Microsoft Exchange Server data. These snapshots are created while these applications (with volume data) remain online. Tivoli Storage FlashCopy Manager provides support to create and manage volume-level snapshots for File Systems and Custom Applications. It uses Microsoft Volume Shadow Copy Services (VSS) and IBM storage hardware snapshot technology to protect your business-critical data.

Seamless installation and configuration features allow Tivoli Storage FlashCopy Manager to be easily integrated with these IBM System Storage products:

- DS3000, DS4000, DS5000, DS8000®
- SAN Volume Controller
- XIV Storage System
- Storwize V7000
- Any hardware storage system that uses the VSS System Provider or a VSS Provider that complies with the Microsoft VSS Provider interface.

Optionally, Tivoli Storage FlashCopy Manager can be integrated with Tivoli Storage Manager. This integration provides advanced data protection and centrally managed, policy-based administration. The TSM Configuration Wizard will guide you through this integration process.

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Chapter 2. Planning

Planning information is provided about the applications, devices, and Microsoft Volume Shadow Copy Service (VSS) guidelines for your IBM Tivoli Storage FlashCopy Manager for Windows environment.

Capacity planning

Information is provided to help you estimate the storage capacities that are required to install and use Tivoli Storage FlashCopy Manager.

The storage space required for Tivoli Storage FlashCopy Manager is divided into the following categories:

- Space required for the global product installation on a system
- Space required for holding Tivoli Storage FlashCopy Manager metadata
- Space required on the storage device for the actual snapshot backups

Global product installation

The space that is required for the global product installation of Tivoli Storage FlashCopy Manager depends on which components are installed.

The following table contains the space requirements for the Tivoli Storage FlashCopy Manager Microsoft Management Console (MMC).

Table 7. Tivoli Storage FlashCopy Manager Microsoft Management Console space requirements

Component	x86	x64
Base product	40 MB	43 MB
Prerequisites	46 MB	46 MB
Language packs (x9)	6 MB each	6 MB each

The MMC is required and is automatically installed for all installations.

The following table contains the space requirements for the Tivoli Storage FlashCopy Manager VSS Requestor.

Table 8. Tivoli Storage FlashCopy Manager VSS Requestor space requirements

Component	x86	x64
Base product	350 MB	500 MB
Prerequisites	N/A	N/A
Language packs (x9)	15 MB each	15 MB each

The VSS Requestor is required and is automatically installed whenever the support for Microsoft Exchange Server or Microsoft SQL Server environments is configured.

The following table contains the space requirements for Tivoli Storage FlashCopy Manager for Exchange Server.

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Table 9. Tivoli Storage FlashCopy Manager for Exchange Server space requirements

Component	x64
Base product	75 MB
Prerequisites	N/A
Language packs (x9)	5 MB each

Tivoli Storage FlashCopy Manager for Exchange Server is required for the backup and restore of Exchange Server data.

The following table contains the space requirements for Tivoli Storage FlashCopy Manager for SQL Server.

Table 10. Tivoli Storage FlashCopy Manager for SQL Server space requirements

Component	x86	x64
Base product	70 MB	75 MB
Prerequisites	36 MB	64 MB
Language packs (x9)	5 MB each	5 MB each

Tivoli Storage FlashCopy Manager for SQL Server is required for backup and restore of SQL Server data.

The complete downloadable package size is 425 MB. When the expanded files from this package are included, the size is 2.1 GB.

Tivoli Storage FlashCopy Manager metadata

In addition to the space that is required for the global product installation, Tivoli Storage FlashCopy Manager uses disk space to hold vital product data that is used to track and manage snapshots. The amount of space required is directly proportional to the number of snapshots that you maintain on the system. Ensure that there is at least 1 megabyte of available free disk space to hold the metadata for each snapshot that you plan to keep on the system.

In addition, if you are protecting an Exchange Server, Tivoli Storage FlashCopy Manager keeps mailbox history information in the metadata to support individual mailbox restore (IMR) processing. The amount of space required for this is directly proportional to the number of mailboxes in the entire organization. Ensure that for each user mailbox in your organization, at least 50 kilobytes of disk space are free to hold the metadata.

Snapshot copies

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

- VSS Provider being used and its configuration
- The total size of all source volumes that contains 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, full snapshot copies require the same amount of space as the corresponding source volumes. Full snapshots are the standard FlashCopy type. However, with the Windows System VSS Provider, space-efficient copies on SAN Volume Controller and the XIV system initially require only sparse space for metadata . The space demand of the

snapshot copies increases with every block that is changed on the corresponding source volume. Accordingly, the more source volume blocks are changed, the more space is required for the target volumes that represent a snapshot copy of those applications. For more details, read the documentation for the specific VSS Provider being used.

VSS Service

Microsoft Volume Shadow Copy Service (VSS) is a Microsoft component that is provided with the Windows operating system. VSS manages and directs the Tivoli Storage FlashCopy Manager VSS requester and other VSS software applications.

Tivoli Storage FlashCopy Manager backup and restore operations use the VSS technology to create online snapshots (point-in-time consistent copies) of Exchange or SQL data and custom application and file system data, and to restore those snapshots to a specified location. The Tivoli Storage FlashCopy Manager VSS operations are implemented through the VSS Requestor, which communicates with the VSS Service to access the Exchange or SQL data.

VSS manages and directs the following applications:

VSS writer
This application places the persistent information for the shadow copy on the specified volumes.

For Exchange data, the Microsoft Exchange Server contains the writer components and requires no configuration.

For SQL data, Microsoft SQL Server contains the writer components (SqlServerWriter service).

VSS requestor
This application sends a command to the VSS provider to create a shadow copy of a specified volume. The VSS Requestor is provided by Tivoli Storage FlashCopy Manager and is installed with the Tivoli Storage FlashCopy Manager software.

VSS provider
This application produces the shadow copy and also manages the volumes where the Exchange or SQL data resides. A provider can by a system provider (such as the one included with the Microsoft Windows operating system), a software provider, or a hardware provider (such as one that is included with a storage system). Configuration requirements are based upon the type of VSS provider that is used in your environment. For example:

- If you use the Windows VSS system provider, no configuration is required.
- If you use VSS Instant Restores, DS8000, SAN Volume Controller, Storwize V7000, and the XIV system are the only storage systems that you can use for VSS Instant Restore operations and require a VSS provider. Therefore, if you use DS8000 or SAN Volume Controller, or Storwize V7000 storage systems, you *must* install and configure IBM System Storage Support for Microsoft Virtual Disk and Volume Shadow Copy Services as your VSS hardware provider to perform VSS Instant Restore operations.

Tip: Throughout the remainder of this document, the phrase "VSS hardware provider" is used to refer to IBM System Storage Support for Microsoft Virtual Disk and Volume Shadow Copy Services

If you use the XIV system, you must install and configure IBM XIV Provider for Microsoft Windows Volume Shadow Copy Service (xProv) 2.3.0.

- If you are using a different VSS provider, consult the documentation provided with your VSS provider.

System Provider

A system provider assists with creating and maintaining copies on local shadow volumes.

If you are using the Windows VSS System Provider, no configuration tasks are required to perform VSS operations.

SAN Volume Controller and Storwize V7000 FlashCopy support

Thin provisioning or the ability to allocate less physical storage than the declared size of a logical storage volume is available with SAN Volume Controller and Storwize V7000. A thinly provisioned volume is referred to as a space efficient (SE) volume.

For more information about thinly provisioned volumes, see this website: http://publib.boulder.ibm.com/infocenter/svc/ic/index.jsp?topic=%2Fcom.ibm.storage.svc.console.doc%2Fsvc_spaceefficentvdisks_3r7ayd.html

Important: References to SAN Volume Controller in this section are referring to the following versions:

- 5.1.x (or later)
- 6.1.x (or later)
- 6.2.x (or later)

SAN Volume Controller and Storwize V7000 provide FlashCopy restore from SE target volumes as well as from fully allocated target volumes for which the background copy of the VSS Backup backup has not yet completed. This enhancement in the SAN Volume Controller copy services is exploited by Tivoli Storage FlashCopy Manager, beginning with version 2.2. It is now possible to retain multiple FlashCopy images of a source volume as backup generations at a much reduced storage cost, since it is not necessary to allocate the full size of the source volume for each backup generation, while still maintaining the ability to do instant restore using FlashCopy from the SE target volumes.

SAN Volume Controller and Storwize V7000 minimizes the overhead required to maintain multiple snapshots of the same source volume by putting the target volumes into a cascade where each target is dependent on changes recorded in target volumes of subsequent snapshots. For example, if four VSS snapshots are created of a source volume, where S is the source and T1 through T4 are the targets, with T1 being the first chronologically and T4 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 latest FlashCopy target. Any blocks that remain unchanged on the source volume are not copied at all. However, the cascaded relationship, where multiple SE target volumes have the same FlashCopy source, requires some special considerations when you use the target volumes as backup versions managed by Tivoli Storage FlashCopy Manager.

The following sections provide guidance and best practices for effective use of Tivoli Storage FlashCopy Manager with SAN Volume Controller and Storwize V7000.

Use of FlashCopy Manager with SAN Volume Controller and Storwize V7000

Tivoli Storage FlashCopy Manager exploitation of SAN Volume Controller and Storwize V7000 FlashCopy capabilities on Windows is dependent on the Volume Shadow Copy Service (VSS) hardware provider for SAN Volume Controller and Storwize V7000. Configuration of the VSS provider for SAN Volume Controller and Storwize V7000 controls what type of FlashCopy is performed when a VSS snapshot is requested, and the resultant behavior when you use VSS snapshots.

The VSS provider (4.1.x or later) that supports SAN Volume Controller and Storwize V7000 has the following characteristics:

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

  In this case, deletion of the VSS snapshot removes the snapshot from the VSS inventory, but the FlashCopy relationship remains on SAN Volume Controller and Storwize V7000, so that a subsequent VSS snapshot of the same source volume will result in an incremental refresh of the target volume.
- When the VSS provider is configured to use SE target volumes - specifically, when the background copy rate is set to zero - the following is true:
  - Deletion of a VSS snapshot represented by a target volume in a cascade causes all target volumes dependent on the volume being deleted (in other words, the target volumes that were created earlier) also to be deleted. For example, deletion of a snapshot represented by target volume *T2* in the sample cascade *S -> T4 -> T3 -> T2 -> T1* causes *T2* and *T1* to be deleted, and the cascade *S -> T4 -> T3* to remain after the deletion.

    Important: When you manually delete backups on SAN Volume Controller and Storwize V7000 space-efficient target volumes, and multiple backup versions exist, the backup being deleted as well as any older backups that contain the same volumes are deleted. Please take note that the deletion might not be performed 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 being restored, as well as to all newer targets in the cascade. For example, restore of a snapshot represented by target volume *T3* in the sample cascade *S -> T4 -> T3 -> T2 -> T1* causes *T4* and *T3* to be deleted, and the cascade *S -> T2 -> T1* to remain after the restore.

    One exception to this pattern is that a FlashCopy restore from an SE target that is the only target in the cascade is not destructive.

– If an SE target volume runs out of space to hold the data from changed blocks on the source volume, that target volume and all target volumes dependent on that target volume go offline and render those backup versions unusable.

Note: An *SE backup version* is defined by a FlashCopy to an SE target volume that has a background copy rate of zero. Use of SE target volumes with "autoexpand" enabled and a background copy rate greater than zero does not create *SE backup versions*, because the target volumes grow to the allocated size of the source volumes when the background copy completes.

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

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

  A transition from fully allocated targets to SE targets is accommodated by treating fully allocated targets as if they were SE when the background copy rate is set to 0.
- When using SE backup versions:
  – Do not mix persistent and nonpersistent VSS snapshots. Use of a nonpersistent VSS snapshot following 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 preserving local snapshot backup versions. Put another way, `backupdestination=LOCAL` and `backupdestination=TSM` are mutually exclusive settings. Do not use both in a backup strategy.
  – Enable *autoexpand* for the SE target volumes, to avoid out-of-space conditions.
  – Allocate enough space for SE target volumes to hold 120% of the data expected to change on the source volume in the time between snapshots. For example, if a database changes at a rate of 20% per day, VSS backups are done every 6 hours, and a steady rate of change throughout the day is assumed, the expected change rate between snapshots is 5% of the source volume (20/4). Therefore, the space allocated to the SE target volumes should be 1.2 x 5% = 6% 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 based on the defined policy, to ensure that deletion is done in the proper order. This avoids deletion of more backup versions than expected.

SAN Volume Controller and Storwize V7000 configurations

This table provides recommended configurations for typical use case scenarios and objectives for the backup and recovery solution.

Table 11. Snapshot restore and delete behavior on SAN Volume Controller and Storwize V7000 space-efficient target volumes

Use Cases / Objectives	SAN Volume Controller and Storwize V7000 Settings	VSS Provider Settings	Tivoli Storage FlashCopy Manager Settings	Comments
- production application data resides on standard volumes - keep 14 snapshot backup versions - use minimum storage space for snapshot backup versions. Full physical copy not required - perform 2 VSS backups per day	- 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	- set background copy rate = 0	- set policy to retain 14 local backup versions - schedule snapshot backups as desired using backupdestination = local	- once 14 VSS backups have been done, the 15th VSS backup will cause the oldest backup to be deleted and will reuse that target set.
- production application data resides on standard volumes - keep 1 snapshot backup version - use minimum storage space for snapshot backup versions. Full physical copy not required - perform 1 VSS backup per day and also send the backup to TSM	- create 2 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	- set background copy rate = 0	- set policy to retain 2 local backup versions - schedule snapshot backups as desired using backupdestination = both	- set 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 may not be available should a VSS backup fail after the prior backup was deleted
- production application data resides on standard volumes - keep 1 snapshot backup version - full physical copy is required - minimize overhead of background copies - perform 1 VSS backup per day and also send the backup to TSM	- create one standard target vol for each source vol to be protected - add standard target volumes to the VSS free pool	- use default background copy rate (50) - configure to use Incremental FC	- set policy to retain 1 local backup version - schedule snapshot backups as desired using backupdestination = both	- When using INCR FC, the VSS provider will not delete the single snapshot target set even though FlashCopy Manager will delete the prior VSS snapshot before creating a new one

Table 11. Snapshot restore and delete behavior on SAN Volume Controller and Storwize V7000 space-efficient target volumes (continued)

Use Cases / Objectives	SAN Volume Controller and Storwize V7000 Settings	VSS Provider Settings	Tivoli Storage FlashCopy Manager Settings	Comments
- production application data resides on standard volumes - keep 2 snapshot backup versions - full physical copies are required for local backup versions - perform VSS backups every 12 hours with one backup daily sent to TSM	- create 3 standard target vols for each source vol to be protected - add standard target volumes to the VSS free pool	- use default background copy rate (50)	- set policy to retain 3 local backup versions - schedule VSS backups as follows: - backupdestination = local at 11:00 - backupdestination = both at 23:00	- set policy for local snapshot backups to retain N+1 backup versions so that N snapshot backups are available for restore.
- production application data resides on standard volumes - keep 4 snapshot backup versions - use minimum storage space for snapshot backup versions. Full physical copy not required - perform VSS backups every 6 hours with one backup daily sent to TSM	- create 5 SE target vols for each source vol to be protected - enable autoexpand for the SE target volumes - add SE target volumes to the VSS free pool	- set background copy rate = 0	- set policy for local snapshot backups to retain 5 local backup versions - schedule VSS backups as follows: - backupdestination = local at 06:00, 12:00 and 18:00 - backupdestination = both at 00:00	- set policy to retain N+1 backup versions so that N snapshot backups are available for restore
- production application data resides on SE volumes - keep 2 snapshot backup versions - full physical copies are required for local backup versions - perform VSS backups every 6 hours with one backup daily sent to TSM	- create 3 SE target vols for each source vol to be protected - allocate same percentage of real storage as for source volumes - add SE target volumes to the VSS free pool	- use default background copy rate (50)	- set policy to retain 3 local backup versions - schedule VSS backups as follows: - backupdestination = local at 06:00, 12:00 and 18:00 - backupdestination = both at 00:00	- set policy for local snapshot backups to retain N+1 backup versions so that N snapshot backups are available for restore - allows thin provisioning for both source and target vols and lets them grow together

Using space-efficient target volumes with SAN Volume Controller and Storwize V7000

SAN Volume Controller and Storwize V7000 require special considerations when using space-efficient target volumes.

Tivoli Storage FlashCopy Manager Version 2.1 limited VSS Instant Restore operations to only one snapshot backup version on SAN Volume Controller space-efficient target volumes. File-level copy restore is used for all other situations. Tivoli Storage FlashCopy Manager Version 3.1 (or later) supports VSS Instant Restore operations when multiple backup versions exist on SAN Volume Controller and Storwize V7000 space-efficient target volumes. However, in this situation, VSS Instant Restore accesses 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 being restored. These snapshot volumes are removed in order for the VSS Instant Restore operation to complete successfully. As a result, the backups that included the deleted snapshots are removed from storage. This destructive restore operation only occurs when VSS Instant Restore operations occur in an environment where Tivoli Storage FlashCopy Manager manages multiple backup versions on SAN Volume Controller and Storwize V7000 space-efficient target volumes.

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

Important: When manually deleting backups on SAN Volume Controller and Storwize V7000 space-efficient target volumes and multiple backup versions exist, delete the backups in the same order that they were created. Otherwise, the FlashCopy mappings remain because of cascaded dependencies.

Table 12. Snapshot restore and delete behavior on SAN Volume Controller and Storwize V7000 space-efficient target volumes

Snapshots on space-efficient volumes	Snapshot to be restored	Snapshot deleted
s1, s2, s3, s4	s1	s1, s2, s3, s4
s1, s2, s3, s4	s4	s4
s1, s2, s3, s4	s2	s2, s3, s4
s1	s1	None

Note: The order of backup creation in the table is s1, s2, s3, s4.

Verifying snapshot creation

Use the IBM VSS provider `ibmvcfg` command to verify whether snapshots are created on SAN Volume Controller and Storwize V7000 space-efficient target volumes:

1. In a Windows command prompt, issue `ibmvcfg list infc -l` to display the FlashCopy mapping attributes. The `Tgt Type` column displays the FlashCopy mappings for the volumes attached to the current host. For example:

   ```
   Tgt Type

   Space Efficient
   ```

```
Space Efficient
Space Efficient
Space Efficient
Standard
```

2. Verify that the IBM VSS provider type states `SVC Pegasus`. For example:

```
Physical host.
Provider Type is SVC Pegasus.
```

Migration considerations

Migration from Tivoli Storage FlashCopy Manager 2.x is supported. After upgrading and configuring Tivoli Storage FlashCopy Manager 3.1, you can restore local VSS backups that were originally created with Tivoli Storage FlashCopy Manager 2.x.

Guidelines for SAN Volume Controller and Storwize V7000 environments

Review the following guidelines before attempting backup operations:

- Determine whether to use space-efficient or fully allocated backup targets before issuing a backup operation. Provision enough target volumes in the SAN Volume Controller VSS_FREE volume group for as many as the backup versions you require. If you are using fully allocated target volumes, their capacity size 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 issuing the `ibmvcfg set backgroundCopy 0` command. Restart the IBM VSS system service after issuing the command. For more details about configuring the IBM VSS Hardware Provider for space-efficient target volumes, make sure to read the appropriate VSS-related content in the SAN Volume Controller and 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 resides on SAN Volume Controller or Storwize V7000 volumes, and the VDisks in the VSS_FREE pool are space efficient, then VSS Instant Restore from multiple backups is possible. However, the VSS Instant Restore operation in this environment is destructive.
- The Windows host must be attached to an SAN Volume Controller or Storwize V7000 cluster. The volumes assigned to the Windows host must be participating in the SAN Volume Controller or Storwize V7000 cluster.
- Make sure that IBM VSS hardware provider version 4.1 (or later) is installed. This provider must be configured to accommodate multiple backup versions on SAN Volume Controller or Storwize V7000 space-efficient target volumes.
- Multiple snapshots on SAN Volume Controller or Storwize V7000 space-efficient VDisks are not supported for single-copy cluster (SCC) environments. These SCC environments include Microsoft Cluster Server (MSCS) and Veritas Cluster Server (VCS) environments. Multiple snapshots are not supported because VSS snapshots are not automatically identified as "cluster aware."

These guidelines apply specifically to NOCOPY FlashCopy backups on SAN Volume Controller and 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 important information regarding these two issues:

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

Tip: Space-efficient target volumes go offline when their capacity limit is exceeded. As a result, the current backup and all older backups (which have not reached FULL_COPY status) are lost. To avoid this situation, use the AUTOEXPAND option when creating space-efficient targets. This option allocates additional physical storage in order to prevent space-efficient target volumes going offline.

Restriction: When using VSS Instant Restore operations with multiple backup versions existing on SAN Volume Controller or Storwize V7000 space-efficient target volumes, only use full or copy type backups when the backup destination specifies local. A local backup (including any local backups created after the one being restored) is deleted by SAN Volume Controller or Storwize V7000 because of the destructive restore behavior. As a result, any full, copy, incremental, or differential local backup is removed and unavailable for restore operations. If you want to use incremental or differential local backups with SAN Volume Controller or Storwize V7000 space-efficient target volumes, disable VSS Instant Restore during any restore operations to avoid this situation.

Additional considerations when using SAN Volume Controller and Storwize V7000

The default background copy rate is 50. This value minimizes impact to response time for host system i/o, but it may not complete background copies as quickly as desired. Increasing the background copy rate 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 higher than 85, because this can significantly lengthen response times to I/O from host systems.

Planning protection for Microsoft Exchange Server data

Tivoli Storage FlashCopy Manager helps protect and manage Exchange Server environments by facilitating the back up, restore, and recovery of Exchange Server data. Tasks required for backing up and restoring Microsoft Exchange Server data are provided.

Exchange Server versioning

Certain Tivoli Storage FlashCopy Manager functions vary based upon the version of Exchange Server in your environment.

Exchange Server 2010 introduces functions that differ from functions available with Exchange Server 2007:

- Exchange Server 2010 provides database availability groups (DAG). A DAG consists of mailbox servers that provide recovery from database, server, or network failures. DAGs provide continuous replication and continuous mailbox availability. They replace LCR, CCR, and SCR replication.
- Exchange databases replace Exchange storage groups.
- The Recovery Database (RDB) replaces the Recovery Storage Group (RSG).

- The number of databases allowed for each Exchange server increases from 50 to 100.
- Single Copy Clustering (SCC) is not available with Exchange Server 2010.
- Exchange Management Shell commands have been changed to support the new Exchange features and storage configuration.

Continuous replication backups on Exchange Server

Continuous replication backups are an effective use of Exchange Server 2007 and Exchange Server 2010 features.

Important:

- If you are using Exchange Server 2007, consider using Exchange Server Local Continuous Replication (LCR) or Cluster Continuous Replication (CCR) technology to help protect your Exchange Server and possibly reduce the frequency of backup operations.
- If you are using Exchange Server 2010, consider using Database Mobility and Availability Group (DAG) technology to help protect your Exchange Server and possibly reduce the frequency of backup operations.

Replication on Exchange Server 2007

Review your Microsoft documentation for important details regarding this replication technology. If you are operating Data Protection for Exchange in an Exchange Server LCR or CCR environment and you want to back up from the replica copy as opposed to the primary database to reduce the impact of backups, select the ***From replica, if available*** option in the GUI Backup window or specify the ***/fromreplica*** parameter with the **tdpexcc backup** command. For CCR copies, you must run the backup while logged in to the secondary node of the cluster that currently contains the replica copy. If you are restoring a CCR database, after the restore completes successfully, the cluster database is mounted. However, due to a Microsoft Exchange Server 2007 limitation, the database resources are not brought online. You must bring the database resources online using the Microsoft Cluster Administrator interface. See the following Microsoft Knowledge Base article for details regarding this limitation:http://support.microsoft.com/kb/938442/en-us. In an LCR or CCR environment, the production copy of the database can still be backed up.

When issuing a VSS Instant Restore in a CCR environment, stop the Microsoft Exchange Replication Service on both the active node and the passive node before starting the restore operation.

Microsoft does not support VSS backups of Standby Continuous Replication (SCR) replicas. If your Exchange Server 2007 environment is configured to use SCR replicas, you must back up the original database in the SCR scenario.

CCR local backups can only be restored to the node that performed the backup.

Replication on Exchange Server 2010

Database Availability Groups (DAG) are the new Exchange Server high availability feature for Exchange 2010. Database Mobility and Availability Groups replace LCR, CCR, and SCR replication features. They provide for enhanced data and service availability and automatic recovery from failures. DAG implementations are similar to the Exchange Server 2007 CCR structure, but with some differences.

Database copies are mirrored on any node within the DAG. The active copy can also be moved to other nodes. You can create a backup from the active copy or from any passive copy within the DAG that contains a database copy.

Tivoli Storage FlashCopy Manager includes the following functions for Exchange Server 2010 DAGs:

- Querying of DAG database copies and their status
- Full, copy, incremental, and differential backups of active and passive databases managed within a DAG
- Querying of all DAG database copy backups
- Restoring of all DAG database copy backups
- Restoring into an active database, from either active or passive database copy backups
- Restoring into a Recovery (or alternate) database
- Mailbox restore (IMR) from a DAG database copy backup
- Deletion of DAG database copy backups

Consider these requirements when using Tivoli Storage FlashCopy Manager with Exchange Server 2010 DAGs:

- Backups for a given database should be performed from the same Exchange server, if possible. Backups performed from different Exchange servers are managed separately.
- Restores must be performed on an active database copy.

Review your Microsoft documentation for important details regarding this new replication technology.

Database Availability Group backup best practices

Perform backups for replicated database copies from the same Exchange Server. Additionally, perform backups on the passive database copies, so as not to increase the load on the production Exchange Server.

Following are the recommended best practices for backup:

- Perform backups from a passive database copy, to avoid increasing the load on the active databases.
- Perform backups for DAG databases from the same server, to simplify restore procedures and scheduling.
- Optionally, use the command line backup option **/EXCLUDENONDAGDBS** to exclude the databases that are not part of the DAG.
- Use the command-line backup options **/EXCLUDEDAGPASSIVE**, **/EXCLUDEDAGACTIVE**, or **/EXCLUDENONDAGDBS** to exclude certain databases from backup processing. See “Backup optional parameters” on page 102 for details about these processing options.

Database Availability Group restore best practices

Microsoft requires that you perform restores for databases in (DAG) environments on the active database copy. If you want to restore to a passive database copy, the copy must first be moved to the active state. Once the restore is complete, you can move the active database copy back to the passive state.

Following are the recommended best practices for restore:

- Perform restores to the active database copy.
- For recovering DAG database backups to alternate Exchange servers, follow the specialized steps that are documented in "Restoring VSS Backups into other locations" on page 22.

For detailed instructions on performing a recovery of a DAG database, see "Restoring a Database Availability Group database copy backup on Exchange Server 2010" on page 78.

Software or hardware provider considerations

A software or hardware provider acts as an interface during VSS processing at the software or hardware level respectively.

If you perform VSS operations, consider the following information when planning for VSS operations on Exchange data:

- If a hardware provider is used, it is recommended that the disks that contain Exchange data be configured as basic.
- In the case of Exchange Server 2007 data, place database files for each storage group on their own dedicated logical volume.
- In the case of Exchange Server 2010 data, place database files for each database on their own dedicated logical volume.
- Place logs for each storage group (Exchange Server 2007) or database (Exchange Server 2010) on their own logical volume.
- Do not place non-Exchange data on storage volumes that are dedicated to Exchange.
- When using hardware or software snapshot providers, do not share storage group or database LUNs with other storage groups or databases, or other applications.
- Make sure to read and follow specific installation and configuration instructions in the documentation provided by your VSS provider vendor.
- VSS Instant Restore is supported on IBM Systems Storage SAN Volume Controller, DS8000, the XIV system, and IBM Storwize V7000 storage subsystems.
- If you use XIV, you *must* install and configure IBM XIV Provider for Microsoft Windows Volume Shadow Copy Service (xProv) 2.3.0.

Restriction: For DS8000, SAN Volume Controller, and IBM Storwize V7000 storage systems, if you have enabled the incremental FlashCopy option of your VSS provider, the provider will always use (or reuse) the same target set for each VSS snapshot request (of a given source set). This occurs regardless of the number of backup versions specified or the number of target volumes defined in the VSS free pool. However, to exploit incremental refresh of the same target volumes, you must set the Tivoli Storage FlashCopy Manager policy to have a version limit of 1 so that Tivoli Storage FlashCopy Manager does not delete the previous snapshot backup prior to creating the new backup. In this configuration, Tivoli Storage FlashCopy Manager will incorrectly show that two backup versions exist when in fact only one (the latest) really exists but if the version limit in Tivoli Storage FlashCopy Manager is set to 1, then each snapshot backup will cause a full background copy from source to target volumes.

In addition, in order to use incremental FlashCopy with DS8000, the following two applications are also required:

- Tivoli Storage Manager Backup-Archive Client Version 6.3 or later
- IBM System Storage Support for Microsoft Virtual Disk and Volume Shadow Copy Services Version 4.1 or later

Backing up Exchange Server data

Tivoli Storage FlashCopy Manager backs up storage groups (Exchange Server 2007) and databases (Exchange Server 2010) using Microsoft Volume Shadow Copy Service (VSS) technology.

VSS Backup

A VSS Backup of Exchange data uses Microsoft Volume Shadow Copy Service technology to produce an online snapshot (point-in-time consistent copies) of the data. A VSS Backup storage destination must have sufficient space available for the snapshot.

A VSS Backup allows a snapshot of large amounts of data at once. During a VSS Backup, the Exchange or SQL server is not in "backup mode" for an extended period of time, because the length of time to perform the snapshot is usually measured in seconds and not hours.

VSS Backups are stored on VSS shadow volumes, which the Exchange system can directly access.

Requirement: The shadow copy volume that is the storage destination of a snapshot must have sufficient space for the snapshot. The amount of space required is dependant on the VSS provider that is used.

VSS Backups expiration during VSS Backup operations

When a VSS Backup occurs, if the maximum number of backup versions to be retained (as specified by the Tivoli Storage FlashCopy Manager policy) is exceeded, the oldest backup version is expired and deleted before creating the new backup.

When a VSS Backup occurs, if the maximum number of days to retain a backup (as specified by the Tivoli Storage FlashCopy Manager policy) is reached, the *inactive* backup versions older than the number of days specified are expired before creating the new backup.

See “Managing policy using Tivoli Storage FlashCopy Manager” on page 60 for details about setting and managing policy.

Exchange data VSS Backup characteristics

VSS Backups for Exchange data have the following characteristics:

- Full, copy, differential, and incremental backup types are supported.
- Backups are managed through Tivoli Storage FlashCopy Manager policy. Different policy settings can be defined for each backup type.
- Backup granularity for Exchange Server 2007 is at the storage group level only. Backup granularity for Exchange Server 2010 is at the database level.
- Backups can be performed in a Microsoft Cluster Server (MSCS) or Veritas Cluster Server (VCS) environment.
- Backups do not provide Exchange Server database zeroing function.
- Backups provide Exchange Server database integrity check function.

- Restore into a Recovery Storage Group is supported on Exchange Server 2007 only.
- Restore into a Recovery Database is supported on Exchange Server 2010 only.
- There is no automatic retry for VSS operations.
- Although it is possible for a storage group to have the same name as another storage group because it uses different letter cases in the name, Tivoli Storage FlashCopy Manager does not differentiate between the letter cases, and therefore does not recognize that two separate storage groups exist with the same name. This is due to the Windows operating system not recognizing case sensitivity. VSS operation errors might occur when using Tivoli Storage FlashCopy Manager to backup, query, restore, or delete such a storage group. Therefore, make sure the storage group has a unique name.

Exchange data VSS Backup planning requirements

Plan a VSS Backup strategy to optimize your backup operations performance and avoid potential problems.

Consider the following requirements when planning for VSS Backups.

- Have a well-defined and tested recovery plan that meets your service level objectives.
- Review best practice recommendations by Microsoft for your level of Exchange Server; for example, Microsoft recommends one database per storage group with Exchange Server 2007.
- Consider using LCR and CCR replicas on Exchange Server 2007 in accordance with Microsoft recommendations.
- Consider using DAG database copies on Exchange Server 2010 in accordance with Microsoft recommendations.
- Use single hardware LUNs for log and system files.
- Use single hardware LUNs for the database files.
- Use basic disks.
- Consider the VSS provider-specific implementation and configuration options when setting up your strategy. For example, if your VSS hardware provider supports a full-copy snapshot versus a copy-on-write (COW) snapshot mechanism, be aware that full-copy type implementations have greater disk storage requirements but are less risky because they do not rely on the original volume to restore the data. COW implementations require much less disk storage but rely completely on the original volume to perform a restore. Since these implementations are entirely controlled by the VSS provider and not Tivoli Storage FlashCopy Manager, make sure to consult your VSS provider documentation for a complete understanding of your VSS implementation.
- If you must perform parallel VSS Backups, make sure to stagger the start of the backups for at least ten minutes. This action ensures the snapshot operations do not overlap. Failure to stagger the snapshots can result in errors.
- When enabling circular logging for a storage group or database, incremental and differential backup types are not allowed. This is a Microsoft restriction.
- Do not place multiple volumes on the same LUN. Microsoft recommends that you configure a single volume/single partition/single LUN as 1 to 1 to 1.
- Do not set the `ASNODENAME` option in the `dsm.opt` file when using FlashCopy Manager for Exchange Server. Setting `ASNODENAME` can cause VSS backups and VSS restores to fail.

Planning requirements for differential and incremental Exchange backups

A differential backup backs up the transaction log changes that occurred since the last full backup completed. When a differential backup is restored, you must first restore the full backup, followed by the differential backup being applied. An incremental backup backs up the transaction log changes that occurred since the last incremental or full backup completed. When an incremental backup is restored, you must first restore the full backup, followed by the application of all subsequent incremental backups. When using the Tivoli Storage FlashCopy Manager GUI to restore Exchange differential or incremental backups, all backups (differential, incremental, or full) required for the operation are automatically selected. When using the Tivoli Storage FlashCopy Manager command line to restore these backups, each backup must be specified. Before a differential or incremental backup can be performed, a full backup must be completed.

Consider your hardware configuration when implementing differential and incremental backups. For example, although differential and incremental backups typically require less storage demands than full backups, XIV and DS8000 use different amounts of storage per snapshot and as a result, might require a different backup strategy depending on which storage system is used.

Be aware that differential and incremental backups cannot be mixed together. For example, these two series of backup operations are supported:

- Full backup, plus differential backup, plus differential backup.
- Full backup, plus incremental backup, plus incremental backup.

However, this series of backup operations is not supported because an attempt was made to mix the differential and incremental backups:

- Full backup, plus differential backup, plus incremental backup.

Differential and incremental VSS Backups on space-efficient target volumes on SAN Volume Controller and Storwize V7000 are automatically deleted during a VSS Instant Restore of the full VSS Backup. As a result, do not create VSS Backups on space-efficient target volumes on SAN Volume Controller or Storwize V7000. For more information, see “Using space-efficient target volumes with SAN Volume Controller and Storwize V7000” on page 11.

Backup strategies

Depending on your specific requirements regarding backup window, and acceptable restore times, you might choose to follow different backup strategies. It is important to understand all aspects of Exchange Server disaster recovery, as well as backup considerations recommended by Microsoft. Refer to your Exchange Server documentation for this information.

The following list includes some of the commonly used backup strategies:

- If you choose a strategy that involves incremental or differential backups, circular logging must be disabled on the storage groups (Exchange Server 2007) or on the databases (Exchange Server 2010) of the Exchange Server.
- Do not mix incremental and differential backups.
- To help protect your Exchange Server and potentially reduce the frequency of backup operations, consider using Exchange Server LCR or CCR replication technology (Exchange Server 2007) or DAG database replication technology (Exchange Server 2010). Refer to your Microsoft documentation for details

regarding these technologies. When performing a CCR restore, ensure that Cluster Continuous Replication (CCR) local backups are restored to the node that performed the backup.

- If you are using Exchange Server 2010, consider using DAG database replication technologies. Refer to your Microsoft documentation for details regarding this technology.

Restoring Exchange Server data

The Tivoli Storage FlashCopy Manager restore operations are VSS Fast Restore and VSS Instant Restore. They restore VSS Backups (Exchange database and log files) that reside on Tivoli Storage FlashCopy Manager managed storage to their original or to an alternate location.

VSS Fast Restore

A VSS Fast Restore restores VSS Backups that reside on local shadow volumes.

With a VSS Fast Restore restore, an application can become operational relatively quickly. After data is restored, the transaction logs must still be replayed, which can increase application recovery time. The following characteristics are true of VSS Fast Restore restores:

- Full, copy, differential and incremental backup types can be restored.
- Restore granularity is at the database level.
- VSS restores support restoring one (or more) databases from a VSS snapshot backup located on local shadow volumes managed by Tivoli Storage FlashCopy Manager.
- Supports restoring an Exchange Server 2007 VSS Backup to an alternate storage group.
- Supports restoring an Exchange Server 2010 VSS Backup to an alternate database.
- Restores can be performed in a Microsoft Cluster Server (MSCS) environment.
- Parallel VSS restore operations are not supported on Microsoft Windows Server 2003.

VSS Instant Restore

A VSS Instant Restore occurs when a set of target volumes that contain a valid snapshot are copied back to the original source volumes using hardware-assisted volume-level copy mechanisms. The application can return to normal operations as soon as the hardware-assisted volume-level copy has been started and the log replay is complete.

The key component of producing a VSS Instant Restore is the speed with which the application can become operational with the data that resides on local shadow volumes. Even though the data is restored relatively quickly, the transaction logs must still be replayed after the restore and therefore, the time of recovery for the application can increase.

VSS Instant Restore is the VSS restore method that is used for local VSS Backups of the SAN-attached volumes from IBM Systems Storage SAN Volume Controller, DS8000, the XIV system, or IBM Storwize V7000 using a VSS hardware provider. The supported levels for the hardware storage systems and all the requirements are provided in the documentation of the corresponding VSS hardware provider. VSS Instant Restore of differential and incremental backups is not supported.

VSS Instant Restore is only possible when all of the data (from the storage group or database specified for restore) resides on storage systems supported by VSS Instant Restore. VSS Instant Restore can also be disabled so that Tivoli Storage FlashCopy Manager uses VSS Fast Restore instead. When performing VSS Instant Restore for SAN Volume Controller versions prior to version 5.1 or DS8000 storage systems consider this: when using copy-type FlashCopy, make sure that any previous background copies (that involve the volumes being restored) are completed prior to initiating the VSS Instant Restore. However, this is not applicable for the XIV system, or SAN Volume Controller or Storwize V7000 when using Space-Efficient FlashCopy.

Tivoli Storage FlashCopy Manager supports VSS Instant Restore operations when multiple backup versions exist on SAN Volume Controller or Storwize V7000 space-efficient target volumes. However, in this situation, VSS Instant Restore accesses 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 being restored. These snapshot volumes are removed in order for the VSS Instant Restore operation to complete successfully. As a result, the backups that included the deleted snapshots are deleted from storage. This destructive restore operation only occurs when VSS Instant Restore operations occur in an environment where Tivoli Storage FlashCopy Manager manages multiple backup versions on SAN Volume Controller or Storwize V7000 space-efficient target volumes.

When performing a VSS Instant Restore on Exchange Server 2007, you must restore *all* databases within the specified storage group. If you need to restore just one database from a VSS Backup that resides on local VSS shadow volumes on DS, SAN Volume Controller, Storwize V7000, or XIV disks, set the **InstantRestore** option to *False* in the Restore Options pane in the **Recover** tab of the MMC GUI, or specify ***/instantrestore***=*no* on the command-line interface. If VSS Instant Restore capability is needed for single databases, place these databases in their own storage group.

VSS Instant Restore capability is automatically disabled during any of these VSS restore scenarios:

- A VSS restore into the Recovery Storage Group (RSG) on Exchange Server 2007.
- A VSS restore into the Recovery Database (RDB) on Exchange Server 2010.
- A VSS restore into a relocated or alternate storage group on Exchange Server 2007.
- A VSS restore from an LCR replica backup (on Exchange Server 2007) when the passive node is converted to the active node.
- The "Restorefiles command" on page 135 is issued.

Although VSS Instant Restore is the default restore method when all Exchange data specified for a restore resides on storage systems supported by the VSS Instant Restore, a failover to VSS Fast Restore can occur when an error is detected early enough in the VSS Instant Restore process to trigger the failover. In this situation, an error is logged in the dsmerror.log file. However, a failover to VSS Fast Restore might not always be possible. For example, if an error occurs later in the restore process (such as a pending background copy on the storage system, a failure to start the FlashCopy operation on the snapshot provider system, or other hardware error), VSS Instant Restore processing fails without a failover to VSS Fast Restore.

Preparing for VSS Instant Restore:

When preparing for VSS Instant Restore, take into account VSS Instant Restore considerations such as the restore granularity and requirements for where backups must reside.

Consider the following points when planning for VSS Instant Restore:

- Full and copy backup types can be restored.
- VSS restores support restoring one or more storage groups or databases from a VSS snapshot backup located on local shadow volumes managed by Tivoli Storage FlashCopy Manager.
- Before you begin a VSS Instant Restore operation, you must close any applications or windows that might have files or handles open on the volumes being restored.
- Restore granularity is at the storage group and database level.
- VSS requires that data must always be restored to the same drive letters and paths as existed during the original backup.
- VSS requires either an IBM XIV Provider for Microsoft Windows Volume Shadow Copy Service or IBM System Storage Support for Microsoft Volume Shadow Copy Service software.
- Backups must reside on the same IBM Systems Storage SAN Volume Controller, DS8000, the XIV system, or IBM Storwize V7000 storage subsystem to which they are restored.
- In a CCR environment, suspend the storage group copy before performing the VSS Instant Restore. After the VSS Instant Restore completes, resume the storage group copy.
- Restores can be performed in a Microsoft Cluster Server (MSCS) environment.
- Parallel VSS restore operations are not supported on Microsoft Windows Server 2003 and later.

Restoring VSS Backups into other locations

You can restore an Exchange Server 2007 storage group, CCR replica, or LCR replica (that has been backed up using VSS) into the Recovery Storage Group or into another (or relocated) storage group. An Exchange Server 2010 database backup or DAG active or passive database copy backup can be restored into a Recovery Database or into another (or relocated) database.

This restore capability is known as a "restore into" scenario and has these requirements:

- If you are performing a VSS Restore of a relocated storage group (Exchange Server 2007) or relocated database (Exchange Server 2010), you must use the **Restore Into** function and specify the same storage group name or database name as the one that you are restoring. The restore fails if you do not specify the same name.
- Performing any type of "restore into" function automatically disables VSS Instant Restore.

Planning protection for Microsoft SQL Server data

Tivoli Storage FlashCopy Manager helps protect and manage SQL Server environments by facilitating the back up, restore, and recovery of SQL data. Tasks required for backing up and restoring Microsoft SQL Server data are provided.

Software or hardware provider considerations

A software or hardware provider acts as an interface during VSS processing at the software or hardware level respectively.

If you perform VSS operations, consider the following information when planning for VSS operations on SQL data:

- If a hardware provider is used, configure the disks that contain SQL data as basic.
- Place databases files for each database or group of databases that will be backed up and restored together as a unit on their own dedicated logical volume.
- Place logs for each database on their own logical volume.
- Do not place non-SQL data on storage volumes that are dedicated to SQL.
- When using hardware or software snapshot providers, do not share database LUNs with other databases or applications.
- Make sure to read and follow specific installation and configuration instructions in the documentation provided by your VSS provider vendor.
- VSS Instant Restore is supported on IBM Systems Storage SAN Volume Controller, DS8000, the XIV system, and IBM Storwize V7000 storage subsystems.
- If you use XIV, you *must* install and configure IBM XIV Provider for Microsoft Windows Volume Shadow Copy Service (xProv) 2.3.0.

Restriction: For DS8000, SAN Volume Controller, and Storwize V7000 storage systems, if you have enabled the incremental FlashCopy option of your VSS provider, the provider will always use or reuse the same target set for each VSS snapshot request of a given source set. This occurs regardless of the number of backup versions specified or the number of target volumes defined in the VSS free pool (`VSS_FREE volgroup`). However, to exploit incremental refresh of the same target volumes, you must set the Tivoli Storage FlashCopy Manager policy to have a version limit of 1 so that Tivoli Storage FlashCopy Manager does not delete the previous snapshot backup prior to creating the new backup. In this configuration, Tivoli Storage FlashCopy Manager will incorrectly show that two backup versions exist when in fact only one (the latest) really exists but if the version limit in Tivoli Storage FlashCopy Manager is set to 1, then each snapshot backup will cause a full background copy from source to target volumes.

In addition, in order to use incremental FlashCopy with DS8000, the following two applications are also required:

- Tivoli Storage Manager Backup-Archive Client Version 6.3 or later
- IBM System Storage Support for Microsoft Virtual Disk and Volume Shadow Copy Services Version 4.1 or later

Backing up SQL Server data

Tivoli Storage FlashCopy Manager backs up SQL Server 2005, SQL Server 2008, and SQL Server 2008 R2 data by using Microsoft Volume Shadow Copy Service (VSS) technology.

VSS Backup

A VSS Backup of SQL data uses Microsoft Volume Shadow Copy Service technology to produce an online snapshot (point-in-time consistent copies) of the data. A VSS Backup storage destination must have sufficient space available for the snapshot. The amount of space required is dependant on the VSS provider that is used.

A VSS Backup allows a snapshot of large amounts of data at once. During a VSS Backup, the SQL server is not in "backup mode" for an extended period of time, because the length of time to perform the snapshot is usually measured in seconds and not hours.

VSS Backups are stored on VSS shadow volumes, which the SQL system can directly access.

If a VSS Backup is performed when the maximum number of backup versions to be retained (as specified by the Tivoli Storage FlashCopy Manager) is exceeded, the oldest backup version is expired and deleted before creating the new backup.

If a VSS Backup is performed when the maximum number of days to retain a backup (as specified by the Tivoli Storage FlashCopy Manager policy) is reached, the *inactive* backup versions older than the number of days specified are expired before creating the new backup. See “Managing policy using Tivoli Storage FlashCopy Manager” on page 60 for details about setting and managing policy.

Requirement: The shadow copy volume that is the storage destination of a snapshot must have sufficient space for the snapshot. The amount of space required is dependant on the VSS provider that is used.

VSS Backups expiration during VSS Backup operations

When a VSS Backup occurs, if the maximum number of backup versions to be retained (as specified by the Tivoli Storage FlashCopy Manager policy) is exceeded, the oldest backup version is expired and deleted before creating the new backup.

When a VSS Backup occurs, if the maximum number of days to retain a backup (as specified by the Tivoli Storage FlashCopy Manager policy) is reached, the *inactive* backup versions older than the number of days specified are expired before creating the new backup.

See “Managing policy using Tivoli Storage FlashCopy Manager” on page 60 for details about setting and managing policy.

SQL data VSS Backup characteristics

VSS Backups for SQL data have the following characteristics:

- The full backup type is supported. Log, differential, file, group, and set backup types are not supported.
- Backup granularity is at the database level only.
- Backups are managed through Tivoli Storage FlashCopy Manager policy.

- Backups are stored on local shadow volumes. The shadow copy volume that is the storage destination of a snapshot must have sufficient space for the snapshot.
- There is no automatic retry for VSS operations.
- Although it is possible for a database to have the same name as another database by using different letter cases in the name, Tivoli Storage FlashCopy Manager does not differentiate between the letter cases and therefore, does not recognize that two separate databases exist with the same name. This is because the Windows operating system not recognizing case sensitivity. VSS operation errors might occur when using Tivoli Storage FlashCopy Manager to backup, query, restore, or delete such a database. As a result, make sure the database has a unique name.

SQL data VSS Backup planning requirements

Plan a VSS Backup strategy to optimize your backup operations performance and avoid potential problems.

Consider the following requirements when planning for VSS Backups.

- Have a well-defined and tested recovery plan that meets your service level objectives.
- Use single hardware LUNs for each database or group of databases that will be backed up and restored together as a unit.
- Use basic disks.
- Consider the VSS provider-specific implementation and configuration options when setting up your strategy. For example, if your VSS hardware provider supports a full-copy snapshot versus a copy-on-write (COW) snapshot mechanism, be aware that full-copy type implementations have greater disk storage requirements but are less risky because they do not rely on the original volume to restore the data. COW implementations require much less disk storage but rely completely on the original volume to perform a restore. Since these implementations are entirely controlled by the VSS provider and not Tivoli Storage FlashCopy Manager, make sure to consult your VSS provider documentation for a complete understanding of your VSS implementation.
- Do not attempt parallel VSS Backups, which are not supported by VSS and can create problems.
- Do not place multiple volumes on the same LUN. Microsoft recommends that you configure a single volume/single partition/single LUN as 1 to 1 to 1.
- Do not set the `ASNODENAME` option in the `dsm.opt` file when using Tivoli Storage FlashCopy Manager for SQL. Setting `ASNODENAME` can cause VSS backups and VSS restores to fail.

Backup strategies:

Different backup strategies are available depending on specific requirements regarding backup window and acceptable restore times.

Some commonly used strategies (based upon backup type) are described as follows: Consult your Microsoft SQL Server documentation for more details on SQL Server backup strategy and planning.

Some commonly used strategies are described as follows:

Clustering

If you use Microsoft Cluster Server or Veritas Cluster Server clustering for

fail-over support, you must install Tivoli Storage FlashCopy Manager for SQL on each cluster node and configure it identically. Additional setup is required to complete the fail-over installation. You must identify a clustered SQL Server by its virtual server name and use that name in Tivoli Storage FlashCopy Manager for SQL to access that SQL Server.

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

Other strategies

- Performing a large number of full backups can result in the database log to become full. Subsequent backups will fail if this occurs. Use native SQL Server tools (if necessary) to truncate the log of your SQL databases.
- VSS Backups cannot be restored to an alternate SQL Server. This is a Microsoft SQL Server limitation.
- You cannot back up the *tempdb* database. It is a temporary database that is re-created each time the SQL Server is started.
- Regardless of the frequency of database backups, be sure to always run **dbcc checkdb** and **dbcc checkcatalog** on a database just before backing it up to verify the logical and physical consistency of the database. See your SQL Server documentation for more information about using the SQL Server database consistency checker.

Restoring SQL Server data

The Tivoli Storage FlashCopy Manager restore operations are VSS Fast Restore and VSS Instant Restore. They restore VSS Backups (SQL database files and log files) that reside on Tivoli Storage FlashCopy Manager managed storage to their original or to an alternate location.

VSS Fast Restore

A VSS Fast Restore restores VSS Backups that reside on local shadow volumes.

In general, VSS Fast Restore processing can conclude within minutes instead of hours. The following characteristics are true of VSS Fast Restore restores:

- You can only restore SQL Server VSS Backups to the same SQL Server instance.
- Restore granularity is at the database level.
- Supports restoring one (or more) databases from a VSS snapshot managed byTivoli Storage FlashCopy Manager.
- Supports restoring VSS Backups to an alternate location using the ***/relocatedir*** option.
- Restores can be performed in a Microsoft Cluster Server (MSCS) environment.
- Parallel VSS restore operations are not supported on Microsoft Windows Server 2003.

VSS Instant Restore

A VSS Instant Restore occurs when a set of target volumes that contain a valid snapshot are copied back to the original source volumes using hardware-assisted volume-level copy mechanisms. The application can return to normal operations as soon as the hardware-assisted volume-level copy has been started and the log replay is complete.

A IBM Systems Storage SAN Volume Controller, DS8000, the XIV system, or IBM Storwize V7000 storage subsystem is required to perform VSS Instant Restores.

Be aware that a VSS Instant Restore is only possible when all of the data (from the database specified for restore) resides on storage subsystems supported by the VSS Instant Restore. When performing VSS Instant Restores with SAN Volume Controller, Storwize V7000, or DS8000 storage subsystems, a best practice is to make sure that any previous background copies (that involve the volumes being restored) are completed prior to initiating the VSS Instant Restore. However, this check is not necessary for XIV or SAN Volume Controller and Storwize V7000 with space-efficient target volumes.

Although VSS Instant Restore is the default restore method when all SQL data specified for restore resides on storage subsystems supported by the VSS Instant Restore, a failover to VSS Fast Restore can occur when an error is detected early enough in the VSS Instant Restore process to trigger the failover. In this situation, an error is logged in the dsmerror.log file. However, a failover to VSS Fast Restore may not always be possible. For example, if an error occurs later in the restore process (such as a pending background copy on the storage subsystem, a failure to start the FlashCopy operation on the snapshot provider system, or other hardware error), VSS Instant Restore processing fails without a failover to VSS Fast Restore.

You can only restore SQL Server VSS Backups to the same SQL Server instance.

Preparing for VSS Instant Restore:

When preparing for VSS Instant Restore, take into account VSS Instant Restore considerations such as the restore granularity and requirements for where backups must reside.

Consider the following points when planning for VSS Instant Restore:

- VSS restores support restoring one (or more) databases from a VSS snapshot backup located on local shadow volumes managed by Tivoli Storage FlashCopy Manager.
- Before you begin a VSS Instant Restore operation, you must close any applications or windows that are open.
- Restore granularity is at the database level.
- VSS requires that data must always be restored to the same drive letters and paths as existed during the original backup.
- VSS requires either an IBM XIV Provider for Microsoft Windows Volume Shadow Copy Service or IBM System Storage Support for Microsoft Volume Shadow Copy Service software.
- Backups must reside on the same IBM Systems Storage SAN Volume Controller, DS8000, the XIV system, or IBM Storwize V7000 storage subsystem to which they are restored.
- Microsoft hotfix KB 919117 is required when performing VSS Instant Restore operations in a Windows Server 2003 cluster environment.

- Microsoft hotfix KB 952790 is required when performing VSS Instant Restore operations in a Windows Server 2008 non-cluster environment.
- Restores can be performed in a Microsoft Cluster Server (MSCS) environment.
- Parallel VSS restore operations are not supported on Microsoft Windows Server 2003.

Planning protection for custom application and file system data

Tivoli Storage FlashCopy Manager helps protect and manage environments by facilitating the backup, restore, and recovery of custom application and file system data. Tasks required for backing up and restoring custom application and file system data are provided.

Custom application and file system data

Certain Tivoli Storage FlashCopy Manager functions vary based upon the custom application and file systems installed in your environment.

Prior versions of Tivoli Storage FlashCopy Manager supported VSS Backups of Microsoft Exchange Server and Microsoft SQL Server data only. In order to additionally protect and manage data stored on Windows file systems, Tivoli Storage FlashCopy Manager 3.1 introduces custom application and file system support. This support provides VSS Backup capability for data located on Windows file systems. Consider this as having the ability to manage persistent snapshots of the volumes on your system.

These 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 is available in the environment, optionally use the Tivoli Storage Manager Backup-Archive Client to create a backup to Tivoli Storage Manager storage.

To prepare custom application and file systems for volume-level snapshots, preprocessing (PRESNAPSHOTCMD) and postprocessing (POSTSNAPSHOTCMD) scripts can be used. Use these scripts to prepare and resume the application before and after snapshot creation. If specified, these scripts are executed when performing a backup operation. For example, you could use the PRESNAPSHOTCMD script to quiesce an application and the POSTSNAPSHOTCMD to resume it. Tivoli Storage FlashCopy Manager ships with sample scripts for Lotus Domino®. They are called domstop.smp (PRESNAPSHOTCMD) and domstart.smp (POSTSNAPSHOTCMD). These sample scripts are provided as-is and should be modified to fit your environment.

Backing up custom application and file system data

Tivoli Storage FlashCopy Manager backs up custom application and file system data using Microsoft Volume Shadow Copy Service (VSS) technology.

VSS Backup

A VSS Backup of custom application and file system data uses Microsoft Volume Shadow Copy Service technology to produce an online snapshot (point-in-time consistent copies) of the data. A VSS Backup storage destination must have sufficient space available for the snapshot.

A VSS Backup allows a snapshot of large amounts of data at once. During a VSS Backup, the custom application and file system is not in "back up mode" for an extended period of time, because the length of time to perform the snapshot is usually measured in seconds and not hours.

Requirement: The shadow copy volume that is the storage destination of a snapshot must have sufficient space for the snapshot. The amount of space required is dependant on the VSS provider that is used.

VSS Backups expiration during VSS Backup operations

When a VSS Backup occurs, if the maximum number of backup versions to be retained (as specified by the Tivoli Storage FlashCopy Manager policy) is exceeded, the oldest backup version is expired and deleted before creating the new backup.

When a VSS Backup occurs, if the maximum number of days to retain a backup (as specified by the Tivoli Storage FlashCopy Manager policy) is reached, the *inactive* backup versions older than the number of days specified are expired before creating the new backup.

See “Managing policy using Tivoli Storage FlashCopy Manager” on page 60 for details about setting and managing policy.

Custom application and file system data VSS Backup characteristics

VSS Backups for custom application data have the following characteristics:

- Full backup types only are supported.
- Backups are managed through Tivoli Storage FlashCopy Manager policy.
- Backup granularity is at the file system (volume) level. Drives and mount points are both supported.
- Backups can be performed in a Microsoft Cluster Server (MSCS) or Veritas Cluster Server (VCS) environment.
- There is no automatic retry for VSS operations.

Custom application and file system data VSS Backup planning requirements

Plan a VSS Backup strategy to optimize your backup operations performance and avoid potential problems.

Consider the following requirements when planning for VSS Backups.

- Have a well-defined and tested recovery plan that meets your service level objectives.
- Custom application and file system data VSS Backups are only supported on Windows Server operating systems. These backups are not supported on Windows 7 or Windows Vista. Custom application and file system data VSS Backups are only available for New Technology File System (NTFS) volumes.

- Consider the VSS provider-specific implementation and configuration options when setting up your strategy. For example, if your VSS hardware provider supports a full-copy snapshot versus a copy-on-write (COW) snapshot mechanism, be aware that full-copy type implementations have greater disk storage requirements but are less risky because they do not rely on the original volume to restore the data. COW implementations require much less disk storage but rely completely on the original volume to perform a restore. Since these implementations are entirely controlled by the VSS provider and not Tivoli Storage FlashCopy Manager, make sure to consult your VSS provider documentation for a complete understanding of your VSS implementation.
- If you must perform parallel VSS Backups, make sure to stagger the start of the backups for at least ten minutes. This action ensures the snapshot operations do not overlap. Failure to stagger the snapshots can result in errors.
- Do not set the `ASNODENAME` option in the `dsm.opt` file when performing Tivoli Storage FlashCopy Manager VSS backups of custom applications or file systems. Setting `ASNODENAME` can cause VSS backups and VSS restores to fail.

Custom application and file system backup scenarios

Backup scenarios are dependent on your specific requirements regarding backup window and the location of your custom application and file system data.

Creating a VSS snapshot backup

These steps outline the tasks required to back up custom application and file system data to local shadow volumes:

1. If you are backing up an application, stop (or suspend) the custom application and file system. You can do this task automatically by specifying the **/presnapshotcmd** parameter with the **fcmcli backup** command. Or, in the Tivoli Storage FlashCopy Manager GUI, use the **PreSnapshotCmd** option in the Protect window.
2. Create the backup by specifying the **fcmcli backup** command. Or, in the Tivoli Storage FlashCopy Manager GUI, click **Full Backup to Local** option in the Action window.
3. If you are backing up an application, restart (or resume) the application. You can do this task automatically by specifying the **/postsnapshotcmd** parameter with the **fcmcli backup** command. Or, in the Tivoli Storage FlashCopy Manager GUI, use the **PostSnapshotCmd** option in the Protect window.

Creating a file-level backup to the Tivoli Storage Manager server

These steps outline the tasks required to create a file-level backup:

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 created by a volume snapshot.
4. Unmount the VSS snapshot backup.

Restoring custom application and file system data

The Tivoli Storage FlashCopy Manager restore operations are VSS Fast Restore and VSS Instant Restore. They restore VSS Backups that reside on Tivoli Storage FlashCopy Manager managed storage to their original location.

VSS Fast Restore

A VSS Fast Restore restores VSS Backups of custom application and file system data that are located on local shadow volumes.

The following characteristics are true of VSS Fast Restores:

- Restore granularity is at the file system level.
- All files from the VSS snapshot backup are restored to their original location. The VSS Fast Restore operation overwrites any file on the original source location (that existed at the time of the snapshot) with the version stored on the snapshot, even if it is marked read-only.
- VSS restores support restoring one (or more) file systems from a VSS snapshot backup located on local shadow volumes managed by Tivoli Storage FlashCopy Manager.
- Restores can be performed in a Microsoft Cluster Server (MSCS) environment.
- Parallel VSS restore operations are not supported on Microsoft Windows Server 2003.

VSS Instant Restore

A VSS Instant Restore occurs when a set of target volumes that contain a valid snapshot are copied back to the original source volumes using hardware-assisted volume-level copy mechanisms. The application can return to normal operations as soon as the hardware-assisted volume-level copy has been started.

An IBM Systems Storage SAN Volume Controller, DS8000, the XIV system, or IBM Storwize V7000 is required to perform VSS Instant Restores.

A VSS Instant Restore is only possible when all of the custom application and file system data is located on storage subsystems supported by the VSS Instant Restore. When performing VSS Instant Restores with SAN Volume Controller, Storwize V7000, or DS8000 storage subsystems, make sure that any previous background copies (that involve the volumes being restored) are completed before initiating the VSS Instant Restore. However, this check is not necessary for XIV, SAN Volume Controller, or Storwize V7000 with space-efficient target volumes.

Tivoli Storage FlashCopy Manager supports VSS Instant Restore operations when multiple backup versions exist on SAN Volume Controller or Storwize V7000 space-efficient target volumes. However, in this situation, VSS Instant Restore accesses 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 being restored. These snapshot volumes are removed in order for the VSS Instant Restore operation to complete successfully. As a result, the backups that included the deleted snapshots are deleted from storage. This destructive restore operation occurs only when VSS Instant Restore operations occur in an environment where Tivoli Storage FlashCopy Manager manages multiple backup versions on SAN Volume Controller or Storwize V7000 space-efficient target volumes.

Although VSS Instant Restore is the default restore method when all custom application and file system data specified for a restore resides on storage

subsystems supported by the VSS Instant Restore, a failover to VSS Fast Restore can occur when an error is detected early enough in the VSS Instant Restore process to trigger the failover. In this situation, an error is logged in the dsmerror.log file. However, a failover to VSS Fast Restore might not always be possible. For example, if an error occurs later in the restore process (such as a pending background copy on the storage subsystem, a failure to start the FlashCopy operation on the snapshot provider system, or other hardware error), VSS Instant Restore processing fails without a failover to VSS Fast Restore.

Custom application and file system restore scenarios

Restore scenarios are dependent on your specific requirements regarding acceptable restore times and the location of your custom application and file system data.

Restoring the entire volume from a snapshot

These steps outline the tasks required to restore custom application and file system data from local shadow volumes:

1. Stop (or suspend) the custom application. In the case of the 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). Or, in the Tivoli Storage FlashCopy Manager GUI, select the VSS Backup in the Recover window and click **Restore** in the Action window (VSS Fast Restore). For a VSS Instant Restore, select the **InstantRestore** option in the Restore Options pane and then click **Restore**.
3. Complete any actions required to achieve a correct state of the custom application and file system files.
4. If necessary, restart (or resume) the custom application.

Restoring individual files from a snapshot

These steps outline the tasks required to restore individual files from a custom application and file system data VSS Backup on local shadow volumes:

1. Mount the VSS Backup.
2. If necessary, stop (or suspend) the custom application.
3. Issue the Windows `COPY` or `XCOPY` command or use a tool (like Windows Explorer) to copy the files from the VSS Backup to your preferred location.
4. If necessary, complete any actions required to achieve a correct state of the custom application.
5. If necessary, restart (or resume) the custom application.
6. Unmount the VSS Backup.

Restoring individual files from the Tivoli Storage Manager server

These steps outline the tasks required to restore individual files from a custom application and file system data VSS Backup on Tivoli Storage Manager storage:

1. If necessary, stop (or suspend) the custom application.
2. Restore specific files to the Tivoli Storage Manager server by issuing a Tivoli Storage Manager Backup-Archive Client command.
3. If necessary, restart (or resume) the custom application.

Chapter 3. Installing Tivoli Storage FlashCopy Manager

Tivoli Storage FlashCopy Manager wizards guide you through the installation and configuration of Tivoli Storage FlashCopy Manager. After you complete the setup and configuration wizards, your computer is ready to take snapshots.

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

Setup wizard
Use this wizard to install 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 stand-alone computer.

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

Verify prerequisites for Tivoli Storage FlashCopy Manager for Windows

The installation and configuration wizards automatically verify many of the prerequisites as part of the wizard verification process. However, some prerequisites cannot be automatically verified. The host bus adapter (HBA) or multipath I/O (MPIO) software required for your VSS provider are examples of prerequisites that cannot be automatically verified. As a result, make sure your system meets the minimum hardware, software and operating system requirements before you install Tivoli Storage FlashCopy Manager.

These sections describe the minimum Tivoli Storage FlashCopy Manager version 3.1.0 hardware and software requirements identified at the time of publication. Additional details and functional requirements are available in the hardware and software requirements tech note associated with this release. Details of the hardware and software requirements for Tivoli Storage FlashCopy Manager evolve over time as a result of maintenance updates and the addition of operating system, application, and other software currency support. For the most up-to-date requirements, see the hardware and software requirements tech note associated with your product version. Once the page is displayed, follow the link to the requirements tech note for your specific release or update level.

Minimum hardware requirements

The following information describes the minimum hardware requirements for operating the Tivoli Storage FlashCopy Manager product on Windows.

The following hardware is supported for the x86 platform:
Compatible hardware supported by the operating system and the application

The following hardware is supported for the x64 platform:
Compatible hardware supported by the operating system and the application

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Minimum software and operating system requirements for Microsoft Exchange environments

The following operating systems are supported for the x64 platform:

- 64-bit Windows Server 2003 SP2, or later Service Pack levels: Standard x64, Enterprise x64, or Data Center x64 editions
- 64-bit Windows Server 2003 R2 SP2, or later Service Pack levels: Standard x64, Enterprise x64, or Data Center x64 editions
- 64-bit Windows Server 2008 SP2, or later Service Pack levels: Standard x64, Enterprise x64, or Data Center x64, editions
- 64-bit Windows Server 2008 R2 SP2, or later Service Pack levels: Standard x64, Enterprise x64, or Data Center x64, editions

The following additional Operating Environments are supported:

- Microsoft Cluster Server (MSCS) / Windows Failover Clustering
- Veritas Cluster Server (VCS) environments

The following application levels are supported:

- Microsoft Exchange Server 2007 SP3, or later Service Pack levels: Standard or Enterprise Editions
- Microsoft Exchange Server 2010 SP1, and "Update Rollup 2 for Exchange Server 2010 (2425179) or later rollup or later Service Pack levels: Standard or Enterprise Editions

Minimum software and operating system requirements for Microsoft SQL environments

The following operating systems are supported for the x86 platform:

- 32-bit Windows Server 2003 SP2, or later Service Pack levels: Standard, Enterprise, or Data Center editions
- 32-bit Windows Server 2003 R2 SP2, or later Service Pack levels: Standard, Enterprise, or Data Center editions
- 32-bit Windows Server 2008 SP2, or later Service Pack levels: Standard, Enterprise, or Data Center editions

The following operating systems are supported for the x64 platform:

- 64-bit Windows Server 2003 SP2, or later Service Pack levels: Standard x64, Enterprise x64, or Data Center x64 editions
- 64-bit Windows Server 2003 R2 SP2, or later Service Pack levels: Standard x64, Enterprise x64, or Data Center x64 editions
- 64-bit Windows Server 2008 SP2, or later Service Pack levels: Standard x64, Enterprise x64, or Data Center x64, editions
- 64-bit Windows Server 2008 R2, or later Service Pack levels: Standard x64, Enterprise x64, or Data Center x64 editions

The following additional Operating Environments are supported for both x86 and x64 platforms:

- Microsoft Cluster Server (MSCS) / Windows Failover Clustering
- Veritas Cluster Server (VCS) environments

The following application levels are supported for both x86 and x64 platforms.

- Microsoft SQL Server 2005 SP3, or later Service Pack levels: Standard x64 or Enterprise x64 Editions
- Microsoft SQL Server 2008 SP1, or later Service Pack levels: Standard x64 or Enterprise x64 Editions

- Microsoft SQL Server 2008 R2, or later Service Pack levels: Standard, Enterprise, or Data Center Editions

Virtualization Support

Information regarding the virtualization environments supported by Tivoli Storage FlashCopy Manager is documented at http://www.ibm.com/support/docview.wss?uid=swg21433737.

Install Tivoli Storage FlashCopy Manager for Windows

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

Before you begin, verify that your environment meets the hardware and software prerequisites.

Follow these steps to install Tivoli Storage FlashCopy Manager:

1. Install Tivoli Storage FlashCopy Manager using the setup wizard. This installs the base product code and prerequisites such as Report Viewer.
   a. Log on as an administrator.
   b. Insert the Tivoli Storage FlashCopy Manager 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:\setupfcm.exe` where x is your DVD drive. Click **OK**.
   c. Follow the installation instructions displayed on the screen.
   d. Click **Finish** to complete the installation of Tivoli Storage FlashCopy Manager.
2. Configure Tivoli Storage FlashCopy Manager using the configuration wizard.
   a. Start the Management Console. Click **Start** > **All Programs** > **Tivoli Storage FlashCopy Manager** > **FlashCopy Manager Management Console**. If you have not previously configured Tivoli Storage FlashCopy Manager, the configuration wizard starts.
   b. If the configuration wizard does not start automatically, navigate to **IBM Tivoli Storage Manager** > **Dashboard** > **Manage** > **Configuration** > **Wizards** in the tree view, and select one of the following wizards:
      - Standalone configuration wizard
      - Tivoli Storage Manager configuration wizard

      Then click **Start** in the Actions pane.
   c. Use the configuration wizard to select the applications that you would like to protect, verify requirements, provision, and configure the components required to support the selected applications. After you have completed the configuration wizard, you will be able to protect and manage your application data.
3. After you have completed the configuration wizard, verify that everything is properly configured by selecting each workload instance in the tree view and doing the following steps:
   a. Click the **Automate** tab.
   b. Click the **Open** toolbar button.
   c. Type `verify`. The following three file names are listed:

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

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

e. Click the **Run** toolbar button.

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.
5. After Tivoli Storage FlashCopy Manager is operating successfully, define your policy settings and scheduled operations to ensure your business requirements are satisfied.

Install additional languages

When run in a non-English environment, theTivoli Storage FlashCopy Manager setup program (`setupfcm.exe`) automatically starts the corresponding language pack setup program. The component provisioning steps in the local and Tivoli Storage Manager configuration wizards also automatically install language packs for the components based on the language for which the system is configured.

To install support for additional languages, navigate to the language folder of each component on the Tivoli Storage FlashCopy Manager media and run the setup program.

- To install an additional language for MMC snap-in and base system services, run the following command:
  - (64 bit): fcm\x64\mmc\3100\{chs | cht | deu | enu | esp | fra | ita | jpn | kor | ptb}\setup.exe
  - (32 bit): fcm\x86\mmc\3100\{chs | cht | deu | enu | esp | fra | ita | jpn | kor | ptb}\setup.exe
- To install an additional language for FlashCopy Manager for Microsoft Exchange, run the following command:
  - fcm\x64\exc\6300\{chs | cht | deu | enu | esp | fra | ita | jpn | kor | ptb}\setup.exe
- To install an additional language for FlashCopy Manager for Microsoft SQL Server, run the following command:
  - (64 bit): fcm\x64\sql\6300\{chs | cht | deu | enu | esp | fra | ita | jpn | kor | ptb}\setup.exe
  - (32 bit): fcm\x86\sql\6300\{chs | cht | deu | enu | esp | fra | ita | jpn | kor | ptb}\setup.exe
- To install an additional language for FlashCopy Manager VSS Requestor, run the following command:

– (64 bit): fcm\x64\vss\6300\\{chs | cht | deu | enu | esp | fra | ita | jpn | kor | ptb}\setup.exe
– (32 bit): fcm\x86\vss\6300\\{chs | cht | deu | enu | esp | fra | ita | jpn | kor | ptb}\setup.exe

For example, to install the French language pack for the Tivoli Storage FlashCopy Manager MMC snap-in on 64-bit Windows, issue the following command (where the media is mounted on the D drive):

```
d:\fcm\x64\mmc\3100\fra\setup.exe
```

Rerun the preceding command for each installed Tivoli Storage FlashCopy Manager component. Note that the path segment containing numbers is version information that will change over time. For example, in FlashCopy Manager 3.1 the MMC snap-in version is listed as 3100. This value changes to match the component version delivered in each Tivoli Storage FlashCopy Manager release.

How to silently install Tivoli Storage FlashCopy Manager

A silent installation runs on its own without any user interaction.

1. Navigate directly to the location of the appropriate setup program.

   For example, starting from the root folder of the Tivoli Storage FlashCopy Manager media, this command installs the x64 version of Tivoli Storage FlashCopy Manager:

   ```
   cd fcm\x64\mmc\3100\enu
   ```

2. Run the setup.exe file with the following options:

   ```
   setup.exe /s /v"INSTALLDIR=\"C:\Program Files\Tivoli\" ADDLOCAL=\"Client\"
   TRANSFORM=1033.mst REBOOT=ReallySuppress /qn /l*v
   \"C:\Program Files\Tivoli\flashcopymanager\Provisioning\FcmProvisioning.log\""
   ```

   This setup command should be issued using a single line of text.

   Note: 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 will be installed by Tivoli Storage FlashCopy Manager if they have not been installed as prerequisites onto the system. Ensure that all the prerequisites are installed before starting the silent installation, then set the **rebootyesno** option to *No* so that no system restart is required after the silent installation process finishes.

   Tip: Details of prerequisites are included in the Hardware and Software Requirements document for the release level. These requirements are linked to the All Requirements Document, see http://www.ibm.com/support/docview.wss?uid=swg21427692.

Uninstalling Tivoli Storage FlashCopy Manager

When you installed Tivoli Storage FlashCopy Manager, a number of components are saved to your system. These components can be removed using the Windows **Add or Remove Programs** or **Programs and Features** in the Windows control panel. Any files, registry keys, or Windows services that are created by Tivoli Storage FlashCopy Manager that remain must be removed manually.

You must be logged into a Windows account with administrator privileges to complete this task.

Use the following steps to completely remove Tivoli Storage FlashCopy Manager from a computer. After this procedure is performed, all Tivoli Storage FlashCopy Manager data is removed. Adjust the path in the example as needed for your environment.

Attention: Although these are the instructions to completely remove Tivoli Storage FlashCopy Manager from your system, do not remove it if you will reinstall Tivoli Storage FlashCopy Manager and still want to access the snapshots that you created, or if you still want the Tivoli Storage Manager backup-archive client to protect your system.

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.

   Important: If you intend to reinstall Tivoli Storage FlashCopy Manager, do not delete the snapshots or the metadata directory of Tivoli Storage FlashCopy Manager (`C:\adsm.sys`) Otherwise, your snapshots will be lost.
5. Enter the following commands. You can use the command `dsmcutil list` to display any additionally installed Tivoli Storage FlashCopy Manager services. This procedure assumes a default Tivoli Storage FlashCopy Manager configuration.
   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 removing the TSM Client Acceptor, or the TSM Client Acceptor will not be successfully removed.
   c. `dsmcutil remove /name:"TSM Client Acceptor"`
6. From the Windows Control panel, open **Add or Remove Programs** or **Programs and Features**.
7. Uninstall the following items if they are 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. Run the following commands to find the files and remove them from the file system:
   - `cd /d c:\`
   - `rd /s adsm.sys`
   - `cd /d "c:\program files\tivoli"` (If necessary, replace `c:\program files\tivoli` with the correct installation folder.)

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

9. Enter the following command:

   ```
   req 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. Run the following commands. On Windows Server 2008 and later, you must run these commands from a Run as Administrator command prompt window.
    a. Run this command only if you want to completely remove the Tivoli Storage Manager backup-archive client from your system: `reg delete HKLM\SOFTWARE\IBM\ADSM`

       Important: Do not run this command if you still want the backup-archive client to protect your system.

    b. `reg delete HKLM\SOFTWARE\IBM\FLASHCOPYMANAGER`
11. Before issuing the following commands, verify that these two required conditions exist:
    - The entries `HKEY_LOCAL_MACHINE\software\ibm\GSK7` and `HKEY_LOCAL_MACHINE\software\ibm\GSK8` were included in the command output shown in Step 9.
    - No other applications are using IBM GSKIT.

    If either of the preceding conditions exist, run 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 using the following command. Repeat the command for any user accounts configured with Tivoli Storage FlashCopy Manager:
    a. Change to the following directory:

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

       Enter this command:

       ```
       dir _fmux*
       ```

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

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

       ```
       rd /s  "_FmUx,_Version=3.1.0.0,_C_Path_rusomschqavk3w2upyovnjyl331z5qn3"
       ```

Tivoli Storage FlashCopy Manager is now uninstalled from your computer.

Chapter 4. Configuring Tivoli Storage FlashCopy Manager

Plan how to configure Tivoli Storage FlashCopy Manager for Windows.

Configure for stand-alone snapshot support on Windows

The configuration wizard guides you through configuring Tivoli Storage FlashCopy Manager on your computer to provide stand-alone snapshot support.

Follow these steps to configure Tivoli Storage FlashCopy Manager with the Standalone Configuration Wizard.

1. Start the Management Console by selecting **Start** > **All Programs** > **Tivoli Storage FlashCopy Manager** > **FlashCopy Manager Management Console**.

   If the Management Console has not been configured according to the licenses that are detected, then a configuration wizard will start automatically. For example, when a Data Protection license is detected, the Tivoli Storage Manager Configuration Wizard opens automatically. When no Data Protection license is present, the Standalone Configuration wizard is opened automatically.

   If a Data Protection license is installed and you configure the Management Console for the stand-alone configuration, the next time you start the Management Console, the Tivoli Storage Manager Configuration Wizard will start. If you do not want the wizard to start automatically each time you start the Management Console, check **Do not automatically start this wizard** in the first page of the wizard.
2. If the configuration wizard does not start automatically, click **IBM Tivoli Storage Manager** in the tree view, and click **Configuration** in the start page. Then double-click **Wizards**.
3. Double-click **Standalone Configuration** in the results pane. The Standalone Configuration Wizard window is displayed.
4. Follow the instructions on the wizard panels.
   a. Select the applications that you would like to protect. Depending the applications installed, you can select the **SQL Server**, **Exchange Server**, or **File System** work load.

      Tip: Click **Show System Information** to view information about the computer, operating system, processor, and physical memory.
   b. Review the results of the requirements checks. Ensure that you address any errors or warnings.
   c. Select the **Default** or **Custom** configuration setting.

      Choose **Custom** if a Tivoli Storage Manager backup-archive client is already installed and configured to protect the file system by using the default service and options file names. In this case, you can use the **Custom** setting to choose a node name for the Client Acceptor and Remote Agent services to use, an options file, service names, and the HTTP port to use. In this way, Tivoli Storage FlashCopy Manager does not interfere with the existing client operations. If the backup-archive client is not already installed and configured to protect the file system, the **Default** setting is simpler to use.

      When you click **Custom**, additional fields are displayed for you to modify the client service configuration. Review the information in the fields and change any settings that you want.

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- **VSS Requestor node name**: Enter the name of the node that communicates with the VSS Service to access the Exchange, SQL, or custom application and file system data.
- **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.
- **Remote Client Agent service name**: Specify the name of the service that communicates with Windows VSS to perform the VSS operations.

Tip: 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 as soon as you click **Remove**, rather than upon the completion of the wizard.

d. Review the results of the configuration process.

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

5. Click **Finish** in the Completion page to complete the wizard.
6. Optional: If you are running on Windows Server 2008 or later, you can click **Run VSS diagnostics when this wizard exits** to test VSS snapshots on your system after completing the wizard.
7. Verify that Tivoli Storage FlashCopy Manager is correctly configured by selecting a workload in the **Protect and Recover Data** node in the tree view and issuing the appropriate commands in the **Automate** view.
   - For File Systems and Custom Applications:

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

   - For SQL Server:

     ```
     tdpsqlc query tdp
     tdpsqlc query fcm
     tdpsqlc query tsm (if configured for Tivoli Storage Manager)
     tdpsqlc query sql
     ```

   - For Exchange Server:

     ```
     tdpexcc query tdp
     tdpexcc query fcm
     tdpexcc query tsm (if configured for Tivoli Storage Manager)
     tdpexcc query exchange
     ```

   Note: You can also view the configuration settings by clicking **Properties** for each configured workload.

   Tip: While in the **Automate** view, click **Tips** to see a list of helpful tips.

You are now ready to use Tivoli Storage FlashCopy Manager to back up and restore data.

Configure for Tivoli Storage Manager support

Configure Tivoli Storage FlashCopy Manager to protect and manage application data by using a Tivoli Storage Manager server. This configuration includes support for Data Protection for Microsoft SQL Server and Data Protection for Microsoft Exchange Server, if appropriate licenses are in place. Support for File System and Custom Applications are included as well.

Follow these steps to configure Tivoli Storage FlashCopy Manager with the Tivoli Storage Manager Configuration wizard:

1. Start the Management Console by selecting **Start** > **All Programs** > **Tivoli Storage FlashCopy Manager** > **FlashCopy Manager Management Console**.

   If the Management Console has not been configured according to the licenses that are detected, then a configuration wizard will start automatically. For example, when a Data Protection license is detected, the Tivoli Storage Manager Configuration Wizard opens automatically. When no Data Protection license is present, the Standalone Configuration wizard is opened automatically.

   If a Data Protection license is installed and you configure the Management Console for the stand-alone configuration, the next time you start the Management Console, the Tivoli Storage Manager Configuration Wizard will start. If you do not want the wizard to start automatically each time you start the Management Console, check **Do not automatically start this wizard** in the first page of the wizard.
2. If the configuration wizard does not start automatically, click **IBM Tivoli Storage Manager** in the tree view, and click **Configuration** in the start page. Then double-click **Wizards**.
3. Double-click **TSM Configuration** in the results pane. The Tivoli Storage Manager Configuration Wizard window is displayed.
4. Follow the instructions on the wizard panels.
   a. Select the applications that you would like to protect.

      Tip: Click **Show System Information** to view information about the computer, operating system, processor, and physical memory.
   b. Review the results of the requirements checks. Ensure that you address any errors or warnings.

      Tip: Click **Show Details** to view a list of individual requirement results. If you selected to configure an application for which you do not have the necessary license, the license requirement check fails. You must either go back to the Data Protection Selection page and clear the selected application to proceed with the configuration, or obtain the necessary license.
   c. Specify the Tivoli Storage Manager node names to use for the applications that you want to protect.
      - In the **VSS Requestor** field, enter the name of the Tivoli Storage Manager node that communicates with the VSS Service to access the Exchange, SQL, or custom application and file system data.

        Tip: This node name is actually the Tivoli Storage Manager backup-archive client node name.
      - In the **Data Protection for Exchange** or **Data Protection for SQL** field, enter the name of the node where the Data Protection application is installed.

- In the **File System** field, enter the name of the node that backs up custom application and file system data.

  Tip: Name the node name so that you can easily distinguish type of backup that is performed. For example, if your host name is `MALTA`, you can name the VSS Requestor node name "MALTA", and you can name the node name for protecting Microsoft Exchange Server data "MALTA_EXC".

d. Enter information for the Tivoli Storage Manager server you are connecting to.
   - In the **TSM Server Address** field, enter the TCP/IP domain name or a numeric IP address for the Tivoli Storage Manager server that will contain the backups. Obtain this information from your Tivoli Storage Manager administrator.
   - In the **TSM Server Port** field, enter the port number for the Tivoli Storage Manager server that will contain the backups. Obtain this information from your Tivoli 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 will be available at the last 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 to support application data protection.

     If you click **Yes**, the wizard will execute the macro during the Configuration step in the wizard.

     Important: Review the macro file and update it if needed.

     When you click **Yes**, enter this information in the appropriate field:
     - The name of the Tivoli Storage Manager server administrator account.
     - The password for the Tivoli Storage Manager server administrator.
     - Click **Test Communications** if you want to test your connection with the Tivoli Storage Manager server. This button is not available until VSS requestor is installed.
     - Click **Review/Edit** to review or update the Tivoli Storage Manager macro file.

e. Select the **Default** or **Custom** configuration setting.

   Choose **Custom** if a Tivoli Storage Manager backup-archive client is already installed and configured to protect the file system by using the default service and options file names. In this case, you can use the **Custom** setting to choose a node name for the Client Acceptor and Remote Agent services to use, an options file, service names, and the HTTP port to use. In this way, Tivoli Storage FlashCopy Manager does not interfere with the existing client operations. If the backup-archive client is not already installed and configured to protect the file system, the **Default** setting is simpler to use.

   When you click **Custom**, additional fields are displayed for you to modify the client service configuration. Review the information in the fields and change any settings that you want.
   - **VSS Requestor node name**: Displays the name of the node that communicates with the VSS Service to access the Exchange, SQL, or custom application and file system data. This field cannot be updated in this page. If you must change the VSS Requestor node name, click **Previous** until you return to the TSM Node Names page, and update the **VSS Requestor** field there.

- **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.
- **Remote Client Agent service name**: Specify the name of the service that communicates with Windows VSS to perform VSS operations.

Tip: 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 as soon as you click **Remove**, rather than upon the completion of the wizard.

f. Review the results of the configuration process.

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

5. Click **Finish** in the Completion page to complete the wizard.
6. Optional: If you are running on Windows Server 2008 or later, you can click **Run VSS diagnostics when this wizard exits** to test VSS snapshots on your system after completing the wizard.
7. Verify that Tivoli Storage FlashCopy Manager is correctly configured by selecting a workload in the **Protect and Recover Data** node in the tree view and issuing the appropriate commands in the **Automate** view.
   - For File Systems and Custom Applications:

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

   - For SQL Server:

     ```
     tdpsqlc query tdp
     tdpsqlc query fcm
     tdpsqlc query tsm (if configured for Tivoli Storage Manager)
     tdpsqlc query sql
     ```

   - For Exchange Server:

     ```
     tdpexcc query tdp
     tdpexcc query fcm
     tdpexcc query tsm (if configured for Tivoli Storage Manager)
     tdpexcc query exchange
     ```

   Note: You can also view the configuration settings by clicking **Properties** for each configured workload.

   Tip: While in the **Automate** view, click **Tips** to see a list of helpful tips.

You are now ready to use Tivoli Storage FlashCopy Manager to protect and manage data by using a Tivoli Storage Manager server.

Setting user preferences

Use the property pages in the Data Protection Properties window to customize your IBM Tivoli Storage FlashCopy Manager configuration preferences.

The property pages customize preferences such as activity logging or how languages and information are displayed. They are not required to perform a backup.

Be aware of the backup strategy, resource needs, policy settings, and hardware environment capabilities so that you set these preferences to values that enhance IBM Tivoli Storage FlashCopy Manager features.

1. In the tree view of the Management Console, select the Exchange, SQL, or File System instance for which you would like to edit preferences.
2. Click **Properties** in the Action pane. A properties window appears, displaying the name of the selected Exchange, SQL, or File System instance in the window title bar.
3. Select the property page that you would like to view or edit. Available property pages for a workload vary depending on whether it is configured for stand-alone snapshot support or Tivoli Storage Manager support.

   For information about the available property pages, see "Data Protection Properties" on page 50.
4. Edit the property page and click **OK** to save your changes and close the window.

Tip: You can also view or edit properties for the Dashboard. To open the properties window, click **Dashboard** in the tree view, and click **Properties** in the Actions pane.

Chapter 5. Protecting data with Tivoli Storage FlashCopy Manager

Tivoli Storage FlashCopy Manager protects business-critical application data. You can back up and restore data to and from local shadow volumes with automated tasks, utilities, and interfaces.

Tivoli Storage FlashCopy Manager security is governed by standard Windows security. If a user has permission to log into the system and perform snapshot operations for Exchange, SQL or New Technology File System (NTFS), the user also has the ability to use Tivoli Storage FlashCopy Manager to perform those operations.

Starting the Tivoli Storage FlashCopy Manager Management Console

Start the Tivoli Storage FlashCopy Manager Management Console to protect your SQL Server, Exchange Server, or custom application and file system data.

To start the Tivoli Storage FlashCopy Manager Management Console:

1. Click **Start** > **All Programs** > **Tivoli FlashCopy Manager** > **FlashCopy Manager Management Console**.
2. Click a task in the Management section of the start page or use the tree view to begin protecting your SQL Server, Exchange Server, or custom application and file system data.

   The first time you open the Management Console after installing Tivoli Storage FlashCopy Manager, you must configure it. For more information, see Chapter 4, “Configuring Tivoli Storage FlashCopy Manager,” on page 41.

Understanding the Tivoli Storage FlashCopy Manager Dashboard

The Dashboard view contains summary information about activities in the Management Console. Overall application properties for the Management Console are also available from the Dashboard view.

View this information in the IBM Tivoli Storage FlashCopy Manager GUI by clicking **Dashboard** in the start page.

You can customize overall application properties such as email, dashboard, logging, favorite links, reporting, andTivoli Storage Manager server settings by clicking **Properties** in the Action pane.

Graphical charts are displayed in the Dashboard view. Use Dashboard properties to modify order of charts and to specify the number of charts to be displayed in the initial view. You can click **Next** to browse through more charts. Use the tools in the action pane to zoom in or zoom out when viewing a chart or to save a chart as an image file. You can also double-click a chart to zoom in or out.

Task Completion

This chart illustrates backup and restore tasks that completed successfully, with errors, and with warnings. A backup or restore action is logged after initial setup and configuration is complete. For VSS operations, VSS-related configuration must also be complete.

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Type of Data Protection Activity
This chart illustrates the percentage of backup and restore operations.

Backup Activity
This chart illustrates the amount of data that has been backed up.

Restore Activity
This chart illustrates the amount of data that has been restored.

Historical Managed Capacity (TB)
This chart illustrates the amount of data (in terabytes) that was managed during the specified time period.

Average Client-side Compression Ratio
This chart illustrates the average percentage of data that has been compressed by the Tivoli Storage Manager backup-archive client during backup operations.

Average Client-side Deduplication Ratio
This chart illustrates the average percentage of data that has undergone client-side data deduplication during backup operations. Client-side data deduplication removes redundant data during backup processing before the data is transferred to the Tivoli Storage Manager server.

Individual Mailbox Restore Activity
This chart illustrates Individual Mailbox Restore (IMR) operations for Microsoft Exchange Server.

Using the Task Manager

The Task Manager is a centralized control through which IBM Tivoli Storage FlashCopy Manager routes important GUI tasks such as query, backup, restore, and automation.

The Task Manager is available through the Exchange, SQL, and File System workloads under the **Protect and Recover Data** node. It is visible by default; however, you can use the **Hide Activity** or **Show Activity** action (in the Action pane) to determine its visibility. When running backup or restore tasks, use the Task Manager.

Choose a view for the current task in the Task Manager panel:

- **Task List** (default): The default view shows the following information about your operations:

  ```
  -Name
  -State
  -Result
  -Progress
  -Start Time
  -Duration
  -Messages
  ```

  Use the **Task List** view to complete these tasks:

  – Click **Up** and **Down** to modify the processing order for incompleted operations. Hover the cursor on the selected operation to view the command-line input.
  – Click **Stop** to end an operation that is still processing. When an operation cannot be stopped, this button is not available.
  – Click **Remove** to remove a completed or a scheduled operation.

- Copy the selected operation by either clicking the copy icon or right-click and select **Copy**.
- Click the calendar icon to use the scheduler wizard to set up a schedule for the currently selected task.
- Click the Magnifying Glass icon to view detailed about a task.
- Click the Chart icon to view performance information about a task. This icon is not available in stand-alone configuration.

- **Task Details**: Click this item to view the operation information (available in the **Task List**) in detailed format. Click **Mode: Navigate** and use the arrows to view details about each operation. Summary and error information is also available (when applicable).

Learning about Tivoli Storage FlashCopy Manager

Access the most current information related to Tivoli Storage FlashCopy Manager.

Follow these steps to learn about Tivoli Storage FlashCopy Manager:

1. Start the Management Console.
2. In the start page, click **Learning**.
3. In the results view, click one of these links:
   - **IBM.com** - click this link to open the IBM product website.
   - **Online Information** - click this link to view Tivoli Storage FlashCopy Manager-related publications online.

     For Tivoli Storage FlashCopy Manager product documentation, visit http://publib.boulder.ibm.com/infocenter/tsminfo/v6r3/index.jsp.
   - **Support RSS Feed** - click this link to access Tivoli Storage FlashCopy Manager-related information by using Integrated Really Simple Syndication (RSS) content. For further information about Tivoli Storage FlashCopy Manager-related RSS feeds, visit http://www.ibm.com/software/support/rss/tivoli.

   Note: If your computer does not have a connection to the Internet, the external links do not work.

Setting user preferences

Use the property pages in the Data Protection Properties window to customize your IBM Tivoli Storage FlashCopy Manager configuration preferences.

The property pages customize preferences such as activity logging or how languages and information are displayed. They are not required to perform a backup.

Be aware of the backup strategy, resource needs, policy settings, and hardware environment capabilities so that you set these preferences to values that enhance IBM Tivoli Storage FlashCopy Manager features.

1. In the tree view of the Management Console, select the Exchange, SQL, or File System instance for which you would like to edit preferences.
2. Click **Properties** in the Action pane. A properties window appears, displaying the name of the selected Exchange, SQL, or File System instance in the window title bar.

3. Select the property page that you would like to view or edit. Available property pages for a workload vary depending on whether it is configured for stand-alone snapshot support or Tivoli Storage Manager support.

   For information about the available property pages, see "Data Protection Properties."
4. Edit the property page and click **OK** to save your changes and close the window.

Tip: You can also view or edit properties for the Dashboard. To open the properties window, click **Dashboard** in the tree view, and click **Properties** in the Actions pane.

Data Protection Properties

Property pages are available for you to customize your configuration preferences.

The available property pages for a workload vary depending on whether it is configured for stand-alone snapshot support or Tivoli Storage Manager support.

You can view or edit property pages by selecting a workload from the **Protect and Recover Data** node in the tree view of the Management Console, and clicking **Properties** in the Actions pane.

The following tables show which property pages are available for which workload and which snapshot configuration.

Table 13. Property pages for workloads configured for the stand-alone environment

File System	SQL Server	Exchange Server
"Server Information" on page 51	"Server Information" on page 51	"Server Information" on page 51
"Policy Management" on page 52	"Policy Management" on page 52	"Policy Management" on page 52
"VSS Policy Binding" on page 53	"VSS Policy Binding" on page 53	"VSS Policy Binding" on page 53
"Managed Capacity" on page 53	"Managed Capacity" on page 53	"Managed Capacity" on page 53
"Diagnostics" on page 53	"Diagnostics" on page 53	"Diagnostics" on page 53
"Pre/Post Snapshot" on page 57	"SQL Login" on page 60	"General properties for Exchange Server workload" on page 56
"Logging" on page 57	"Logging" on page 57	"Logging" on page 57
"Regional" on page 58	"Regional" on page 58	"Regional" on page 58
"VSS Backup" on page 58	"VSS Backup" on page 58	"VSS Backup" on page 58
	"Custom Settings" on page 59	"Custom Settings" on page 59

Table 14. Property pages for workloads configured for the Tivoli Storage Manager environment

File System	SQL Server	Exchange Server
"Server Information" on page 51	"Server Information" on page 51	"Server Information" on page 51

Table 14. Property pages for workloads configured for the Tivoli Storage Manager environment (continued)

File System	SQL Server	Exchange Server
"Server Password" on page 52	"Server Password" on page 52	"Server Password" on page 52
"VSS Policy Binding" on page 53	"VSS Policy Binding" on page 53	"VSS Policy Binding" on page 53
"Managed Capacity" on page 53	"Managed Capacity" on page 53	"Managed Capacity" on page 53
"Diagnostics" on page 53	"Diagnostics" on page 53	"Diagnostics" on page 53
"Pre/Post Snapshot" on page 57	"SQL Login" on page 60	"General properties for Exchange Server workload" on page 56
"Logging" on page 57	"General properties for SQL Server workload" on page 55	"Logging" on page 57
"Regional" on page 58	"Logging" on page 57	"Regional" on page 58
"VSS Backup" on page 58	"Regional" on page 58	"VSS Backup" on page 58
	"VSS Backup" on page 58	"Custom Settings" on page 59
	"Custom Settings" on page 59	
	"Performance" on page 59	

Server Information

This property page displays information about the server that you contact for backup services.

Different information is displayed depending on whether the product is configured for stand-alone snapshot support or for Tivoli Storage Manager support.

Node name
The name used to identify the client node for stand-alone backup operations or backup operations to Tivoli Storage Manager server.

TSM API version
The version of the Tivoli Storage Manager application programming interface (API).

Server name
For backups to Tivoli Storage Manager, the name of the Tivoli Storage Manager server that you are connected to.

For stand-alone configuration, **Virtual Server** is displayed.

Server Network Host name
Displays the network host name for the Tivoli Storage Manager server.

For stand-alone configuration, **FLASHCOPYMANAGER** is displayed.

Server type
For backups to Tivoli Storage Manager, the type of operating system of the Tivoli Storage Manager server.

For stand-alone configuration, **Virtual Platform** is displayed.

Server version
The version of the Tivoli Storage Manager server.

Compression mode
Indicates whether compression is used during backup operations to the Tivoli Storage Manager server. The possible values are `Yes`, `No`, and `Client Determined`.

Domain name
The policy domain that your node belongs to. A policy domain contains one or more policy sets.

Active Policy Set
The policy set that is active for your policy domain. A policy set contains one or more management class definitions.

Default Management Class
The default policy or management class that contains attributes that determine how long backup versions are stored, where backup versions are stored, and how many backup versions are kept.

Server Password

Use this property page to change the password for accessing the Tivoli Storage Manager server. This property sheet applies only to Tivoli Storage Manager configurations.

Old password
Type the password Tivoli Storage Manager that you want to change.

New password
Type a new password. The password must be 1 - 63 characters in length, and can include any alphanumeric character, underscore (_), period (.), hyphen (-), plus (+), or ampersand (&).

Confirm new password
Type the new password again. Ensure that you click **OK** (or **Apply**) to save your changes.

Policy Management

Use this property page to add or update backup policy to control how different backup versions are retained on shadow volumes on stand-alone snapshot configurations.

Backup retention on local shadow volumes is dictated by 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 storage space required is dependent on the VSS Provider being used.

Click a policy field to edit its content. Click **Add** to add a policy. Click **Delete** to delete a policy. Click **Save** to save and apply your policy changes immediately.

Descriptions of policy fields:

Policy Specify a unique name of a backup policy for the stand-alone configuration.

Number of Snapshots to keep
The number of backup versions to retain on shadow volumes. Specify a number from `1` to `9999`. Type `NL` to retain as many backup versions as permitted by available storage space. The default value is `2`.

Days to keep a Snapshot

The number of days to retain backup versions on shadow volumes. Specify a number from `0` to `9999`. Type `NL` to retain as many backup versions as permitted by available storage space. The default value is `30`.

VSS Policy Binding

Use this property page to bind storage snapshots to backup policies or management classes. VSS policies determine how backups are managed and retained.

VSS policy statements are processed from the bottom to the top and processing stops at the first match. To ensure that more specific statements 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 processed.

Click a field to edit its content. Click **Add** to add a policy binding statement. Click **Delete** to delete a statement. Click **Up** and **Down** to modify the processing order. Click **OK** (or **Apply**) to save or apply your changes immediately.

Note: The policy statements do not take effect on existing or new backups until the next backup is issued.

Managed Capacity

Use this property page to track the capacity of currently managed storage. This information is helpful when you renew your product license.

The total managed capacity is displayed. Typically there is a difference between the capacity used by SQL Server data, Exchange Server data, or file system and custom application data and the capacity of the volume that contains that data. For example, a set of SQL Server databases might require a capacity of 1 GB and occupy a 10 GB volume. When a snapshot of the volume is performed, the managed capacity measurement is 10 GB.

Click **Show Details** to view a list of the volumes that contain backups and their respective managed capacity.

Diagnostics

Use this 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 you want to use by clicking **Normal**, **Complete**, or **Custom**. Then click **Begin** to start the trace. Close the property page. Recreate 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 perform tracing only for MMC GUI.

Diagnostics 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 the MMC GUI only. Only MMC tracing can be performed here.

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, along with the specific trace flags, and guidance on when to use each mode.

Table 15. Diagnostics modes and their usage

Mode	Components traced along with trace flags used	When to use
Normal	MMC, DP (`service`), API (`service,api_detail`)	Use for Legacy operations, results in small output size
Complete	MMC, DP (`service`), API (`service,api_detail`), Agent (`service`)	Use for VSS operations, results in large output size
Custom	Any combination	Use if specific flags are needed

Normal
Click this button to collect trace and log files for Legacy operations.

Complete
Click this button to collect trace and log files for VSS operations.

Custom
Click this button, then click the checkmark icon next to the button to select the trace and log files that you want to collect. Use this mode only if specific trace flags are required.

Enable snapin tracing
Check this box to enable tracing of the Management Console. Click **Review** to view the trace file.

Set Default Trace Flags
Click this button to set the most commonly requested trace flags.

Enable Data Protection tracing
Check this box to enable tracing of Data Protection for Microsoft Exchange Server, Data Protection for Microsoft SQL Server, and file system and custom application support. Click **Review** to view the trace file. Add or update trace flags in the field. Your service representative can tell you which trace flags to use.

Enable DSM Agent tracing
Check this box to enable tracing of the Tivoli Storage Manager client node. You must restart the TSM Client Acceptor service before starting the trace. Click **Review** to view the trace file. Add or update trace flags in the field. Your service representative can tell you which trace flags to use.

Enable API tracing
Check this box to enable tracing of the Tivoli Storage Manager API. Click **Review** to view the trace file. Add or update trace flags in the field. Your service representative can tell you which trace flags to use.

E-mail Select diagnostic files and click this button to send a diagnostic email to an IBM service representative with the selected files attached.

Screenshot
This button 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**.

When the tool opens, click **Add New Screenshot** to add a screen capture to the `FlashCopyManager\ProblemDetermination` folder. The screen capture can be selected with other diagnostic data.

Select All
Click **Select All** to select all files available in the diagnostic results window.

Copy Select the diagnostic files, click **Copy** to open a Browse For Folder dialog, and select a location to copy the selected diagnostic files.

View Click **View** to open the selected diagnostic file.

Delete Click **Delete** to delete the selected diagnostic files.

Tracing details for each component

All trace files are stored in the `flashcopymanager` folder, which is `C:\Program Files\Tivoli\flashcopymanager` by default. When the **End** diagnostics button is clicked these files are automatically copied, compressed, and stored in the `C:\Program Files\Tivoli\flashcopymanager\problemdetermination` folder along with other information.

MMC Options are stored in the MMC user settings file:

```
TraceFm.trc
```

Data Protection
Tracing options are stored in the MMC user settings file and passed to the Data Protection component as part of the command:

```
TraceFileSql.trc
TraceFileExc.trc
TraceFileFs.trc
```

Agent Tracing options are stored in the VSS requestor `dsm.opt` file:

```
TraceFileAgent.trc
```

API Tracing options are stored in the respective Data Protection `dsm.opt` file:

```
TraceFileSqlAPI.trc
TraceFileExcAPI.trc
TraceFileFsAPI.trc
```

General properties for SQL Server workload

Use this property page to specify general preferences for the **SQL Server** workload. This property page applies if the product is configured for backup to stand-alone or Tivoli Storage Manager.

SQL Server
Specify the unique name that identifies the SQL Server instance.

From Server
Use this field when you want to restore a SQL database or database component from another SQL Server. Enter the name of the other SQL Server from which you want to restore backups. By default, this field displays the same name for the **SQL Server** and the **From SQL Server**.

Wait for tape mounts for backup or restore
Check this box when you want Data Protection for SQL 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, it is likely that 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
Check 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 using SQL Server compression
Check 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.

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 if sufficient storage space is available for the backup. The value that is specified here becomes the default value for all differential backups.

This field applies only to Data Protection for Microsoft SQL Server Legacy backups.

General properties for Exchange Server workload

Use this property page to specify general preferences for the **Exchange Server** workload. This property page applies only if your workload is configured for backup to Tivoli Storage Manager.

Temporary Log Restore path
Enter the default temporary path to use when restoring logs and patch files. For best performance, the path that is specified must be 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 performing full, copy, or database copy restores, all log files that are located in the specified path are erased.

Temporary Database Restore path
Specify the directory where the database files that are being restored are temporarily located. Make sure that the directory provides enough space to store the entire mailbox database file. If a directory is not specified, 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
Specify 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, recreated, or moved since the time of the backup. By default, the mailbox restore operation uses the current administrator user's mailbox as a temporary storage location.

Restore Mail Messages as Unread
Specify that restored mail messages are marked as unread.

Exchange Client Access Server
Optionally enter the name of the Client Access Server 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 Client Access Server if the local server has the Client Access Server role installed. The Client Access Server defined by the current logon user mailbox database is used if the local server does not have the Client Access Server role installed.

The name of the Client Access Server, that is defined by the current logon user mailbox database, can be found by running this Exchange Management Shell command:

```
Get-MailboxDatabase -Identity <logon user mailbox database> |
select RpcClientAccessServer
```

When you want to use a different Client Access Server, or if the **RpcClientAccessServer** parameter is not defined, you can define the Client Access Server to be used here.

Backup mailbox history
Check this box if you are using Mailbox Restore operations and you want the mailbox history to be backed up.

Tip: If you do not plan to use mailbox restore or mailbox restore operations, clearing this check box 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
Enter the name of the command script 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
Enter the name of the command script 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.

Important: Batch scripts must include an exit statement with "exit <error_code>" in case a functional error occurs while running the script.

Logging

Use this property page to specify activity log preferences.

Log File Name
Enter the name of the file in which activities are logged.

Enable pruning
Select this option to automatically delete older entries from the log. By default, log pruning is activated and performed daily.

Number of days to keep old entries
Specify 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 button to prune the activity log for one command run.

Regional

Use this property page to set preferences that affect how languages and information are displayed and logged.

Regional and Language options
Click this button to set preferences for the Management Console. The Management Console 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**), and year (**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**).

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.

Match MMC Language
Click this button to change the MMC regional settings to match the system's regional and language options. Clicking this button also matches the number, date, and time formats to the default formats of the selected language.

VSS Backup

Use this property page to configure preferences used during VSS backup operations.

Default Backup Destination
Select the default storage location for your backups. This option is only available for **SQL Server** or **Exchange Server** workloads. You can select from these storage locations:

TSM The backup is stored on Tivoli Storage Manager server storage only. This selection applies to workloads that are configured with the Tivoli Storage Manager server.

Local The backup is stored on local disk only. This selection is the default.

Both The backup is stored on both Tivoli Storage Manager storage and local disk. This selection applies to workloads that are configured with the Tivoli Storage Manager server.

For **File System** workloads, backups are always stored on local disk. For Tivoli Storage Manager configurations, the backups are stored on 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 (the DSM Agent node) of the local client system that creates the VSS backups. This parameter must be specified for VSS operations to succeed.

Remote DSMAGENT Node name
Specify the node name of the machine 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.

This option is only available with **SQL Server** or **Exchange Server** workloads.

Custom Settings

Check the box to display **Show Refresh Options** in the toolbar in the Recover view. This property page is available only with **SQL Server** and **Exchange Server** workloads.

This box is not selected by default. It is useful when used in environments with many thousands of objects stored on a Tivoli Storage Manager server. The administrator can use the **Refresh Options** button and toolbar to switch between manual and automatic refresh mode.

Automatic and manual refresh modes differ in the following manner:

- In automatic refresh mode, the first time a view is selected, it is automatically refreshed. If there are tens of thousands to millions of objects on the server, the refresh can take a long time to complete.
- In manual refresh mode, no automatic refresh takes place. A name filter is available on the **Refresh Options** toolbar, which can be used to narrow down the selection of objects. After you enter a name pattern, you can click **Refresh**. Using manual refresh mode can greatly reduce the amount of information that is returned from the server, and in turn can greatly speed up the completion time. 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. This property sheet is only available with an **Exchange Server** or **SQL Server** workload that is configured for Tivoli Storage Manager support.

DP Buffers
Specify a number from 2 to 8 that specifies the number of communication data buffers that Data Protection for SQL or Data Protection for Exchange uses when transferring data to the Tivoli Storage Manager server. Each buffer is the size that is specified by the **DP Buffer Size** option.

DP Buffer Size
Specify a number from 64 to 8192 that specifies the size of the buffers that are used by Data Protection for SQL or Data Protection for Exchange to transfer data to the Tivoli Storage Manager server.

SQL Buffers
Specify a number from 0 to 999 that specifies the number of communication data buffers that Data Protection for SQL uses when transferring data between the SQL Server and Data Protection for SQL. Each buffer is the size that is specified in the **SQL Buffer Size** option.

SQL Buffer Size
Specify a number from 64 to 4096 that specifies the size of the buffers that are used by Data Protection for SQL to transfer data from the SQL Server to Data Protection for SQL.

Stripes
Specify the number of data stripes from 1 to 64 to use in a Legacy backup or Legacy restore operation. The default value is 1.

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
Click this radio button to use a trusted connection and allow Microsoft Windows to authenticate the logon.

Use SQL Server Authentication
Click this radio button to use SQL User ID security. With this type of security, the administrator provides the logon ID and the password to logon to the Microsoft SQL Server.

User name
Type the SQL User ID.

Password
Type the password to logon to the Microsoft SQL Server.

Managing policy using Tivoli Storage FlashCopy Manager

Manage and configure storage management policy for backups with Tivoli Storage FlashCopy Manager.

Policy definitions are only applicable when using a standalone configuration. If Tivoli Storage FlashCopy Manager is configured to use the Tivoli Storage Manager server, then the policy definitions are defined on the Tivoli Storage Manager server. VSS Policy Bindings are still managed locally.

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

Backup retention on local shadow volumes is dictated by version and time-based policies. Sufficient local storage space must be available on local shadow volumes for a VSS backup strategy to be successful. Ensure there is enough available storage space 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 impact how many backup versions are maintained on local shadow volumes. The amount of space required is dependent on the VSS provider that is used.

Policy binding statements

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

Specify policy binding statements to use for binding snapshots to a policy.

For SQL Server and Exchange Server backups, you can complete this task by using the Management Console or by manually adding binding statements to the configuration file. 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.

To avoid making errors, use the Management Console to specify policy binding statements.

The same policy binding method is used for SQL Server, Exchange Server, or custom application and file system backups. A policy statement is defined in the respective configuration file. However, 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 or storage group (`object name`).

For custom application and file system backups, policy binding statements are stored in the Tivoli Storage FlashCopy Manager configuration file (default is `fcmcfg.xml`) and must be modified only with the Management Console or the **FCMCLI UPDATE VSSPOLICY**, **FCMCLI INSERT VSSPOLICY**, or **FCMCLI DELETE VSSPOLICY** commands.

Custom application and file system data:

The following sample command inserts a new VSS policy binding statement at the position specified by the **SEQnumber** parameter:

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

Where the items in the quotation marks represent the policy definition. In this case:

- Server name = `*`
- Component = `L:\mountdir`
- Backup type= `FULL`
- Backup destination = `LOCAL`
- Management class = `MC1Q11`

Exchange or SQL data:

The following excerpt is from the appropriate Data Protection for SQL or Data Protection for Exchange configuration file:

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

How backups expire based on policy

Backups are expired 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 because their expiration date has passed or the maximum number of backup versions to be retained is reached. The value of this data is dependent on the business needs as identified by the recovery point objective (RPO) and the recovery time objective (RTO). For example, legal, operational, and application requirements impact how data must be protected to meet these RPO and RTO demands. To support such requirements, Tivoli Storage FlashCopy Manager allows you specify the number of snapshot backups to retain and the length of time to retain them. Expiration is how Tivoli Storage FlashCopy Manager implements this function.

Expiration of backups occurs during the first query, backup, or restore operation of a Tivoli Storage FlashCopy Manager session. Expiration of backups might also occur during any backup operation.

If an operation occurs when the maximum number of backup versions to be retained (as specified by the Tivoli Storage FlashCopy Manager policy) is reached, the oldest backup version is expired and deleted before creating, restoring, or displaying information about a backup.

If an operation occurs when the maximum number of days to retain a backup (as specified by the Tivoli Storage FlashCopy Manager policy) is reached, the *inactive* backup versions older than the number of days specified are expired before creating, restoring, or displaying information about a backup.

Setting local backup policy

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

Backup retention on local shadow volumes is dictated by version and time-based policies. Sufficient local storage space must be available on local shadow volumes for a VSS backup strategy to be successful. Ensure that there is enough available storage space 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 required is dependent on the VSS provider that is used.

You can create user-defined policies only in a stand-alone snapshot configuration. VSS Policy Binding is done in both stand-alone mode and Tivoli Storage Manager support mode.

Follow these steps to create and manage your local backup policies. For information about how to create and manage policy with Tivoli Storage Manager, see the Tivoli Storage Manager documentation.

1. Click IBM Tivoli Storage Manager in the tree view of the Management Console.
2. Select an **Exchange Server**, **SQL Server**, or **File System** instance.
3. Click **Properties** in the **Action** pane. A dialog showing the properties for the selected instance is displayed.
4. Select **Policy Management** from the list of available property pages. The existing local policies are displayed.

5. Add, delete, or update local policies for data retention.

   Tip: Double-click a policy field to edit it. Enter `NL` to specify no limit on the number of snapshots to keep or the number of days to keep a snapshot.

   Remember: When adding a new policy, specify a unique policy name, otherwise the policy will not be saved.
6. Save any new or changed policies by clicking **Save**. After you have added a new policy, you can bind an object to that policy. Updates to existing, bound policies goes into effect as soon as the updates are saved.
7. Bind snapshots to new policies by using the **VSS Policy Binding** property page.

   Remember: Click **Save** to save any new or changed bindings.
8. Verify new or updated policies and bindings.
   a. Run one or more test backups.
   b. In the **Recover** tab, verify the management classes that are bound to your test backups.

Binding backups to a policy

Add, update, delete, or change the processing order of existing binding statements. VSS policy determines how backups are managed and retained.

1. Start the Management Console.
2. Select an Exchange, SQL, or File System instance from the tree view.
3. In the **Protect** tab, Click **Properties** in the **Action** pane. A dialog appears that displays properties for the selected instance.
4. Select **VSS Policy Binding** from the list of available property pages. The existing bindings are displayed.
5. Add, update, delete, or change the processing order of existing binding statements.

   Tip: Click on a field to edit it.
   - Any field can take a wildcard character (*) to mean "all". For example, specify a wildcard character (*) in the **Server** field to bind the policy to all Exchange servers, all SQL Servers, or all custom application and file system data.
   - All fields, other than the **Server** field have drop-down menus of available options.
6. Use **Move Up** and **Move Down** to modify the processing order. VSS policies are processed from the bottom up and processing stops at the first match. To ensure that more specific statements 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.
7. Save any new or changed binding statement by clicking **Save statements**.
8. Verify new or updated policies and bindings.
   a. Run one or more test backups.
   b. In the **Recover** tab, verify the management classes that are bound to your test backups.

Determining managed storage capacity

Tracking the capacity of currently managed storage assists during license renewal.

Typically there is a difference between the capacity used by Server data and the capacity of the volume that contains that data. For example, a set of databases might require a capacity of 1 GB and reside on a 10 GB volume. When a snapshot of the volume is performed, the IBM Tivoli Storage FlashCopy Manager managed capacity measurement is 10 GB.

1. Select an Exchange, SQL, or File System instance.
2. In the **Protect**, **Recover**, or **Automate** tab, click **Properties** in the **Action** pane. A dialog appears that displays properties for the selected instance.
3. Select **Managed Capacity** from the list of available property pages. The managed capacity is calculated and displayed.
4. Click **Show Details** to view a list of the volumes (that contain backups) and their respective managed capacity.
5. Click **OK** to close this dialog.

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.

With Tivoli Storage FlashCopy Manager scheduling operations, you can schedule tasks to run periodically. However, you cannot schedule tasks to run one time only. When a schedule is defined, though, it can be run manually at any time by selecting the schedule and then clicking **Run** in the Action pane. For more granular control of your schedules, directly access the Windows scheduled tasks control panel or `schtasks.exe`. Consult your Microsoft documentation for further details.

By default, Tivoli Storage FlashCopy Manager schedules run by using Windows System Account permissions. If a schedule requires different Windows permissions, click **Run as** and enter the appropriate account and password.

All defined schedules appear in the top half of the view. Create, edit, enable, disable, delete, or run new schedules in the top half of the view. Use the Scheduling wizard to guide you through the steps needed to define a local scheduled data protection task. The Scheduling wizard is available from the Action pane.

The Scheduling wizard includes templates that can be used as a starting point for your scheduled tasks. The templates include statements to ensure that the correct working directory is used, and that error information is handled properly. The templates also include sample statements to perform queries and backups.

The scheduling tasks area is divided into three segments:

- Defined schedules display in the top area. The top area contains options to create, edit, enable, disable, delete, or run new schedules.
- A list of all scheduled activity displays in the middle area. Select an item in this list to display the output of the scheduled operation.
- The results of the selected activity displays in the bottom area.

Three types of schedules can be created:

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.

The scheduled history log file keeps entries for 60 days, by default. You can override this default by changing the scheduled history log prune value using the main Tivoli Storage FlashCopy Manager settings control. To access The Main Tivoli Storage FlashCopy Manager settings, in the Tree View select the computer node you want, and then from the Action pane select Properties.

Viewing, printing, and saving reports

Access reports on recent activity, historical managed capacity, and which licenses and software are installed.

Follow these steps to view, save, or print reports.

1. Select **Reporting** in the tree view, under **Manage**. A list of available reports appears. Each report has a description of what data the report contains.
2. Select a report from the list. The selected report appears.
3. To print or save the current report, click the appropriate icon at the top of the report.

How to create snapshots

Tivoli Storage FlashCopy Manager protects your application data by creating point-in-time snapshots of your Microsoft SQL Server, Microsoft Exchange Server, and custom application and file system data.

Creating a snapshot of SQL Server data

In the Tivoli Storage FlashCopy Manager tree view, a SQL Server node is displayed for each SQL Server instance on the computer.

To create a snapshot of an SQL Server instance:

1. Select an **SQL Server** instance in the tree view.
2. Create a snapshot by using one of the following methods:
   - To create snapshots by using the GUI, click the **Protect** tab, select one or more databases from the results pane, and select the applicable backup action.
   - To create backups by using commands, click the **Automate** tab, and enter the commands in the bottom section of the integrated command line.

     Click **Tips** for information regarding the integrated command line.

Creating a snapshot of Exchange Server data

In the Tivoli Storage FlashCopy Manager tree pane, an Exchange Server node is displayed for each Exchange Server instance on the computer.

To create a snapshot of an Exchange Server instance:

1. Select a **Exchange Server** instance in the tree view.
2. Create a snapshot by using one of the following methods:
   - To create snapshots by using the GUI, click the **Protect** tab, select one or more storage groups or databases from the results pane, and select the applicable backup action.
   - To create backups by using commands, click the **Automate** tab, and enter the commands in the bottom section of the integrated command line.

     Click **Tips** for information regarding the integrated command line.

Creating a snapshot of custom application and file system data

In the tree view, a File System node is displayed that represents the custom application and file system data for the computer.

To create a snapshot of a file system or custom application:

1. Select a **File System** in the tree view.
2. Create a snapshot by using one of the following methods:
   - To create snapshots by using the GUI, click the **Protect** tab, select one or more volumes, and click **Full Backup** in the Actions pane.

     Optional: For custom applications, you can specify the presnapshot and postsnapshot batch scripts. The **PreSnapshotCmd** and the **PostSnapshotCmd** options are available in the Snapshot Backup options pane. Click **Show Backup Options** to display these options. This step is not necessary if there is no custom application that is using the file system.
   - To create snapshots by using commands, click the **Automate** tab. and enter the commands in the bottom section of the integrated command line.

     Click **Tips** for information regarding the integrated command line.

Protecting Exchange Server data with IBM Tivoli Storage FlashCopy Manager for Windows

Information is provided regarding how to use the IBM Tivoli Storage FlashCopy Manager for Windows to protect Exchange Server data.

Exchange Server backup and restore prerequisites

To perform backup and restore tasks, IBM Tivoli Storage FlashCopy Manager must meet these prerequisites.

- **Exchange Server 2007**: IBM Tivoli Storage FlashCopy Manager must be operating in an account with membership in the Exchange Organization Administrators group. By default, Windows adds the Exchange Organization Administrators group to other security groups, such as the local Administrators and Exchange Recipient Administrators groups. If these default settings change, the account must be manually added to these other groups.
- **Exchange Server 2010**: IBM Tivoli Storage FlashCopy Manager must be operating in an account with membership in the Organization Management group. You must also have local Administrator privilege.

  For Mailbox Restore and Mailbox Restore Browser operations, membership in the Organization Management group is also required. Also, the Exchange server

must have the Client Access Server Role installed, or Tivoli Storage FlashCopy Manager can be configured to use a different Client Access Server in the domain.

Note: When running Exchange Server 2010 backups, the Exchange database file size can increase due to increased database commitments that are triggered by backup operations. This increase is a Microsoft Exchange server standard behavior.

- For Mailbox Restore operations:
  - The administrator account being used to perform the mailbox restore must have an active Exchange mailbox in the domain.
  - Temporary space is required to accommodate the mailbox database during restore operations. Specify the temporary space in the General property page for the Exchange Server workload. In the General property page, set these two options:
    - **Temporary Log Restore Path**
    - **Temporary Database Restore Path**

    If a directory is not specified, the database files are restored into a directory specified by the environment variable `TEMP`.
  - Make sure that Microsoft Exchange Server MAPI Client and Collaboration Data Objects 1.2.1 level 6.5.8147.0 or later is installed on the Exchange server that you use to perform the mailbox restore operations.

Important: For both Exchange Server 2007 and Exchange Server 2010, Microsoft Outlook cannot be installed on the server that is being used to perform the mailbox restore.

Backing up Exchange Server data

Perform these steps to back up Exchange Server data.

Before you begin, review "Exchange Server backup and restore prerequisites" on page 66.

To back up Exchange Server data:

1. Start the Management Console.
2. Select **Exchange Server** in the tree view. Click the **Protect** tab and select one or more storage groups (Exchange Server 2007) or databases (Exchange Server 2010) to back up. Alternatively, click the **Protect Data** shortcut in the start page of the Management Console.

   Tip: Fine tune the list of available storage groups or databases in the results pane by entering a keyword in the **Search** field.
3. Verify backup options. If the backup options are not currently displayed, click **Show Backup Options**.
   - Click **Skip Exchange Integrity Check** if you do not want to run the Exchange Integrity check to verify that the backups are valid before successfully completing the backup. You can skip the Exchange Integrity check when running in a Database Availability Group environment with databases that have two or more valid copies. See this website for more information: http://msdn.microsoft.com/en-us/library/dd877010(EXCHG.140).aspx

Attention: If this integrity check is skipped and there is an integrity error while trying to restore the database, you might have to run repairs on the database which could result in data loss. If you choose to skip the integrity check and the database is not recoverable due to integrity errors, work with Microsoft support to try and recover the data.

- Use the **From Replica** option to specify whether you want to back up data from a replica copy. This option is available for **Exchange Server 2007**. If you are running in an Exchange Server 2007 Local Continuous Replication (LCR) or Cluster Continuous Replication (CCR) environment and you want to back up data from the replica copy, select **From replica, if available**. For CCR copies, you must run the backup while logged in to the secondary node of the cluster that contains the replica copy. Microsoft does not support backup operations from Standby Continuous Replication (SCR) replicated databases
- **Exchange Server 2010**: If you are running in an Exchange Server 2010 Database Availability Group (DAG) environment, you can back up an active database copy or passive database copy. View the copy status in the `DAG Status` column in the Backup window.

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 will start, complete with the appropriate command that is required to complete the task.
5. Create the backup by selecting the backup action from the **Action** pane.
   - You can perform a full, copy, incremental, or differential backup with the VSS Backup method, depending on the backup strategy that you are using.
   - For Exchange Server 2007, you can also perform Legacy streaming backups. In addition to the backup types listed above, you can also perform Database Copy backups by using the Legacy backup method. The Legacy backup method is only available when configured to the Tivoli Storage Manager server. When you select a storage group, the list of databases in that storage group appears in the lower panel. You can select one of these databases and perform a database copy backup.

Related tasks

"Restoring a Database Availability Group database copy backup on Exchange Server 2010" on page 78

Deleting Exchange Server backups

Perform these steps to delete an Exchange Server backup object that was created with the VSS backup method.

Attention: Do not use this procedure for typical delete tasks as backups are deleted automatically, based on user-defined policy management settings. This procedure is necessary for those deletions that are outside the scope of standard policy management deletions. Perform this task with caution and only as a last resort.

To delete Exchange Server backups:

1. Start the Management Console.
2. Click **Recover Data** in the start page of the Management Console.

3. In the **Recover** tab for the Exchange instance, select one or more backups of storage groups (Exchange Server 2007) or databases (Exchange Server 2010) to delete.
4. Click **Delete Backup** in the **Action** pane to delete the backups of the selected storage groups or databases.

   Attention: When a delete backup is in progress, two tasks appear in the task window to show the deletion is in progress, and that the view is being refreshed. The view content is updated once both tasks are finished.

For special considerations about multiple backups on space-efficient target volumes with SAN Volume Controller and Storwize V7000, see "Using space-efficient target volumes with SAN Volume Controller and Storwize V7000" on page 11.

Restoring an Exchange Server database

Perform these tasks to restore Exchange Server data.

Before you begin, review "Exchange Server backup and restore prerequisites" on page 66.

Attention: When you restore a storage group (Exchange Server 2007) or a database (Exchange Server 2010), existing data is overwritten by the restored data and is no longer available after the restore is complete, unless you redirect the restored data to another Storage Group or Recovery Storage Group (Exchange 2007), or another Database or Recovery Database (Exchange 2010).

To restore Exchange Server data:

1. Start the Management Console.
2. Click **Recover Data** in the start page of the Management Console. In the **Recover** tab for the Exchange instance, select **View: Database Restore**. Use the results pane to browse the storage groups or databases available for backup. The following features are available:
   - Search: Fine tune the list of available storage groups or databases in the results pane by entering a keyword in the **Search** field.
   - Filter: Use the filter options to narrow the list of storage groups or databases in the result pane.
     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 storage group or database Name, Restore Into, From DB Copy, Backup Type, Backup Method, Backup Location, Backup Date, Size (in GB), Instant Restore Supported, Management Class, and Server.

        When you click **Select All**, all rows that reflect the filter specifications are selected.
     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 additional items, click **Add Row**.
     f. Click **Apply Filter** to filter your storage groups or databases.
   - Backups: 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 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 you click **Refresh**, another query is run against the Tivoli Storage Manager server.

3. In the **Recover** tab for the Exchange instance, select one or more storage groups (Exchange Server 2007) or databases (Exchange Server 2010) to restore.

   Tip: If the **AutoSelected** option is set to **True** in the Restore Options view, additional backups necessary to restore the most recent backup are selected for you. If you do not want additional selections made for you, set **AutoSelected** to **False**.

4. Verify restore options. If the restore options are not currently displayed, click **Show Restore Options**.

   For more information about the restore options, see 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 will start, complete with the appropriate command that is required to complete the task.

6. Start the restore operation:
   - To restore the backup, right-click and select **Restore** or click **Restore** in the **Action** pane to begin the restore operation.
   - (Exchange Server 2007) To restore only files from the backup, select the database files in the subwindow to restore. Then, right-click and select **Partial Restore** or click **Partial Restore** in the **Action** pane to begin the partial restore operation.
   - 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 pops up for you to specify the storage group or database to restore into.
     – On Exchange Server 2007, select the name of a storage group into which a VSS Backup is restored. In order to **RestoreInto** a Recovery Storage Group (RSG) or alternate storage group, an RSG or alternate storage group must already exist (with the databases to be restored already added to it) before attempting the restore operation.
     – On Exchange Server 2010, select the name of a database into which a VSS Backup is restored. In order to restore into a Recovery Database (RDB) or alternate database, an RDB or alternate database must already exist before attempting the restore operation.

     Attention: Any type of **Restore Into** function automatically disables VSS Instant Restore.

     Remember:

     a. VSS Instant Restore is only available for FULL or COPY type backups that are located on the disk devices that support VSS Instant Restore.

b. During the VSS Instant Restore operation, the drive or volume where the storage group or database is located must not be accessed by any other process or application.

Restore options

Descriptions of the options available in the Management Console Restore tab are provided.

From the Recover tab, select **Database Restore** and click the **Show Restore Options** to modify the default restore options.

AutoSelected

Set this option to **True** (default) to quickly select the backup objects to restore. With auto-selection, when you select the most recent backup to restore, all other necessary backups are automatically selected for you, up to the previous full backup. For example, **AutoSelected** provides these characteristics:

- Operates when you click a full, differential, or incremental backup.
- Ignores copy and database copy backups.
- When you click a full backup, the latest associated differential or all associated incremental backups are selected.
- 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.

AutoSelected does not make additional selections in these two situations:

- When a combination of differential and incremental backups exist for a full backup. For example, when you click a full backup that has associated incremental and differential backups, only the full backup is selected.
- When a differential or incremental backup is selected and no associated full backup can be found.

FromServer

Enter the name of the server where the original backup was performed. The default value is a wildcard character (*).

Instant Restore

Set this option to **True** to use volume level snapshot restore (Instant Restore) for local VSS Backups if the backup exists on SAN-attached volumes. Set this option to **False** to disable VSS 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 **True**, which uses **volume level snapshot restore** if it is supported.

This option is available for VSS operations only. When using VSS Instant Restore for SAN Volume Controller earlier than version 5.1 or DS8000, a best practice is to make sure that any previous background copies (that involve the volumes being restored) are completed prior to initiating the VSS Instant Restore.

Note: This option is automatically set to **False** during Exchange Server 2007 and Exchange Server 2010 **restoreinto** operations.

Attention: Instant Restore overwrites all files on the destination file system.

Instant Restore requires that the drive or volume where the Storage Group or Mailbox database is located must be free. There must be no access to the drive or volume by any other process or application.

Mount Databases After Restore
Select the **MountDatabasesAfterRestore** option to automatically mount databases within the storage group after the recovery completes. If the Legacy restore operation is a mailbox-database restore to the Recovery Storage Group, the database mounted is the database in the Recovery Storage Group, not the database in the original storage group. Note that if you are restoring a CCR database, the cluster database is mounted successfully. However, due to a Microsoft Exchange Server 2007 limitation, the database resources are not brought online. You must bring the database resources online using the Microsoft Cluster Administrator interface. See the following Microsoft Knowledge Base article for details regarding this limitation: http://support.microsoft.com/kb/938442/en-us

Replay Restored and Current Logs
Use the **ReplayRestoredANDCurrentLogs** option to replay any transaction log entries appearing in the current active-transaction log. This includes both current and restored logs. This is the default value. This option is not supported for VSS Instant Restore.

Replay Restored Logs Only
Use the **ReplayRestoredLogsONLY** option to replay any transactions appearing in the restored-transaction logs. After performing this type of restore, it is highly recommended that you perform a new full backup.

RunRecovery
Select this option to specify whether to replay just the restored logs or to replay both the restored and current logs. When recovery is not run, the databases are not online. As a result, recovery must be run for Legacy restores by either another restore operation (with **RunRecovery** specified) or manually using the ESEUTIL utility.

Note: (**Legacy restores only**) When performing a Legacy restore of mailbox databases, if a Recovery Storage Group exists, mailbox databases will be restored to the Recovery Storage Group instead of to the original storage group. Also, when restoring a mailbox database to a Recovery Storage Group, you must specify the **ReplayRestoredLogsONLY** option or the restore operation may fail. This note ONLY applies to Legacy restores. VSS restores to the Recovery Storage Group are supported by Microsoft with Exchange Server 2007.

Restoring an Exchange Server mailbox (or mailbox items)

This procedure describes how to restore a mailbox or items from a mailbox on Exchange Server 2007 or Exchange Server 2010.

Before you begin, review "Exchange Server backup and restore prerequisites" on page 66.

1. Start the Management Console and select **Exchange Server** in the tree view.
2. Click the **Recover** tab and change the selected view to **Mailbox Restore**.
3. Select one or more mailboxes to restore. If you do not see the mailbox that you want to restore, you can also enter the mailbox name in the restore options. If Mailbox History has been disabled, you are prompted to provide the alias of the mailbox that you want to restore. If you are restoring a mailbox that was deleted, recreated, or moved since the time of the backup, enter the temporary

mailbox alias in the **Property** pane. If this alias is not entered, the mailbox restore operation uses the current administrator user's mailbox as a temporary storage location.

4. Optional: By default, IBM Tivoli Storage FlashCopy Manager restores the most current backup 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. 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 Folder Name, Subject Text, Sender Name, Message Body Text, All Content, Attachment Name, and Received Date.

      When you click **All Content**, the mailbox items are filtered by attachment name, sender, subject, and message body.
   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 additional items, click **Add Row**.
   f. Click **Apply Filter** to filter your storage groups or databases.
5. Verify restore options. If the restore options are not currently displayed, click **Show Restore Options**.

   Mailbox
   Specify the original mailbox alias if it has been deleted or not found in the browser. This option overrides any selected mailboxes.

   MailboxRestoreUnread
   Use this option to automatically mark the mailbox messages as unread after restore operation completes. The default value is **True**.

   OriginalLocation
   Specify the Exchange Server, the Storage Group (Exchange Server 2007), and the database where the mailbox is located at the time of the backup. Use the following formats:
   - Exchange Server 2007: `server-name,sg-name,db-name`
   - Exchange Server 2010: `server-name,db-name`
6. Click one of the **Restore** actions in the Action pane to begin the restore operation.

   Restore Mail to Original Location
   Select this action to restore the mail back 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 appears for you to specify the mailbox

   Restore Mail to PST file
   Select this action to restore the mail items to a personal folders (.pst) file. When restoring to a PST file with one mailbox selected, you are prompted for a file name. When restoring to a PST file with more than one mailbox selected, you are prompted for a directory location. Each mailbox is restored to a separate PST file that bears the name of the mailbox located at the specified directory.

   If the PST file exists, the file will be used. If it does not exist, the file will be created.

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.

Related tasks

"Restoring mailbox messages interactively with the Mailbox Restore Browser"

Restoring mailbox messages interactively with the Mailbox Restore Browser

This procedure describes how to restore a mailbox or items from a mailbox on Exchange Server 2007 or Exchange Server 2010 by using the Mailbox Restore Browser.

Before you begin, review "Exchange Server backup and restore prerequisites" on page 66.

If you plan to restore mail or folders to a Simple Mail Transfer Protocol (SMTP) Server, make sure to configure the SMTP Server before attempting a restore operation. Set the configuration in the IBM Tivoli Storage FlashCopy Manager GUI 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 the Management Console is started, it detects whether there exists a Recovery Storage Group (Exchange Server 2007) or Recovery Database (Exchange Server 2010) that was previously created by Tivoli Storage FlashCopy Manager. If one exists, then the Management Console will automatically connect to the existing Recovery Storage Group or Recovery Database and display its contents. Otherwise, you are prompted for the mailbox or database to restore into the Recovery Storage Group or Recovery Database.
- When a mailbox is selected, it is first automatically restored to the Recovery Storage Group (Exchange Server 2007) or Recovery Database (Exchange Server 2010). It is from this location that the mailbox becomes available for browsing. When the restore operation to this location completes, the restored mailbox and folders are shown in the results pane.
- You can restore the mailbox backup to its original mailbox location or to either or the following locations:
  - To restore a mailbox item to a different mailbox, use the **Open Exchange Mailbox** task in the Action pane. You can enter the alias of the mailbox in order to identify it as the restore destination. This mailbox restore destination is shown in the bottom results pane. Drag the source mailbox from the top results pane to the destination mailbox in the bottom results pane.
  - To restore a mailbox to an Outlook personal folders (`.PST`) file, use the **Open PST File** task in the Action pane. A Windows File dialog opens so that you can select an existing PST file or create a PST file. This specified destination PST file is shown in the bottom results pane. Drag the source mailbox from the top results pane to the destination PST file in the bottom results pane.

  In either case, a merge operation is performed during the restore. If the object exists, Tivoli Storage FlashCopy Manager does not create a duplicate. Tivoli Storage FlashCopy Manager restores only items that do not exist in the restore destination.

  When a mailbox is restored to its original mailbox location, the items are merged. When a mailbox is restored to a different mailbox or to a PST file, the items are restored to a folder that bears the original mailbox name.
- If you select a mailbox to restore, you can choose to **Restore to Original Mailbox Location**. If you select a folder, you can **Restore Folder to Original**

Mailbox, or **Restore Folder to SMTP Server**. If messages are selected you can **Restore Messages to the Original Mailbox**, **Restore Messages to SMTP Server** or **Save Mail Message Content**.

- The **Close Exchange Mailbox** and **Close PST File** tasks in the Action pane are only shown when a mailbox or PST file are browsed.

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

To interactively restore mailbox messages:

1. Start the Management Console.
2. Under the **Protect and Recover Data** node in the tree view, select **Exchange Server**.
3. In the Recover panel, click **View** > **Mailbox Restore Browser**. The Select Source dialog opens.
4. Specify the mailbox to restore in the Select Source dialog:
   a. To browse mailboxes, select **Browse Mailboxes**. You can also switch to the databases view by selecting **Browse Databases** in the drop-down list.

      Enter the name of the mailbox in the **Mailbox Name** field or scroll down through the list and select a mailbox. You can also use the **Search** field to filter the mailboxes or databases. Click **OK**.

      Note: You can also specify a date and time in the **Backup Date/Time** field when you want to restore a backup that was created at a specific point in time.

   b. To browse all mailboxes in a particular backup, specify **Browse Databases**. A list of available backups is displayed. Scroll down the list and select a database. Click **OK**.
   c. If you are restoring a mailbox that was deleted, recreated, or moved since the time of the backup, enter the temporary mailbox alias in the **Property** pane. If this alias is not entered, the mailbox restore operation uses the current administrator user's mailbox as a temporary storage location.

   After the specified mailbox is restored to the Recovery Storage Group (Exchange Server 2007) or Recovery Database (Exchange Server 2010), the restored mailbox and folders are shown in the results pane.
5. Use the results pane to browse the folders and messages contained within your mailbox. The following features are available:
   - Preview: When a mailbox item is selected, its content is shown in the preview panel. When an item contains an attachment, click the attachment icon to preview its contents (click **Open**) or save it (click **Save**).
   - Filter: Use the filter options to narrow the list of folders and messages in the result pane.
     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 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.
     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 additional items, click **Add Row**.
f. Click **Apply Filter** to filter your messages and folders.

Select the mailbox, folder, or message to restore before proceeding.

6. Click the appropriate restore task in the Action pane. Depending on the item selected, the following restore actions are available:
   - **Restore Folder to Original Mailbox**
   - **Restore Messages to Original Mailbox**
   - **Restore Folder to SMTP Server**
   - **Restore Mail to SMTP Server**

     Remember: If the SMTP Server was not configured as described in the prerequisites section, you must configure it in order to complete the restore operation. Click the Restore task, then click **SMTP Settings** to complete the configuration.
   - **Save Mail Message Content**: A Windows Save File dialog is shown. Specify the location and message name and click **Save**. The Save Mail Message Content action becomes available when a message is selected in the preview pane.

   The Restore Progress dialog opens and shows operation details.

   The **Close Mailbox to Restore** button appears after a Recovery Storage Group or Recovery Database is created. When you click this button, Tivoli Storage FlashCopy Manager removes the Recovery Storage Group or Recovery Database it created and cleans up the restored files. If you do not select **Close Mailbox to Restore**, the Recovery Storage Group or Recovery Database is not removed even if you exit the Management Console.

VSS Instant Restore in a Cluster Continuous Replication environment

A Cluster Continuous Replication (CCR) environment on Exchange Server 2007 requires that specific tasks be performed when using VSS Instant Restore.

Consider these guidelines before attempting a VSS Instant Restore in your CCR environment:

- Only use CCR replicas in accordance with Microsoft recommendations.
- CCR is available only with Exchange Server 2007. For Exchange Server 2010, see "Restoring a Database Availability Group database copy backup on Exchange Server 2010" on page 78.
- A VSS Instant Restore of a CCR replica can only be restored into the active copy of the storage group. Microsoft does not support VSS restores into a replica instance.

To do a VSS Instant Restore in a Cluster Continuous Replication environment:

1. Make sure that you perform the restore on an active node.
2. If the backup was created from the passive node, move the cluster from the active node to the passive node.
3. Suspend the storage group copy for the Exchange Server storage groups that will be used in the VSS Instant Restore.
4. Stop the Exchange replication service on the servers before beginning the instant restore.

5. Restore the Exchange Server storage groups by issuing the **tdpexcc restore** command or by using the GUI procedure described in "Restoring an Exchange Server database" on page 69. If you are using the command-line interface, make sure that you dismount the mailbox database before issuing the restore command. This action is performed automatically in the GUI.
6. Resume the storage group copy for the Exchange Server storage groups that was used in the VSS Instant Restore.

Restoring a Cluster Continuous Replication database copy backup on Exchange Server 2007

You can restore a Cluster Continuous Replication database copy backup on Exchange Server 2007.

This procedure assumes that you have already backed up your storage group.

Follow these steps to restore a replicated database copy backup in a Cluster Continuous Replication (CCR) environment. You can perform some of these steps by using either the Management Console or the Management Shell commands, which are provided below in parentheses.

1. Make active the mailbox server that hosts the storage group that you want to restore (Move-ClusteredMailboxServer).
2. Suspend replication of all copies of the storage group (Suspend-StorageGroupCopy).
3. Unmount the database in the storage group (Dismount-Database). If you are using the GUI, the databases are automatically unmounted for you.
4. Restore the database and logs by using the Data Protection for Microsoft Exchange Server command line or the GUI. If you want databases to be mounted automatically after the restore, use the **/MOUNTDAtabases** command-line option, or set **MountDatabasesAfterRestore** in the Restore panel. You can set this option to **True** or **False**.

   Note: For CCR restores, you can only restore CCR local backups to the node that performed the backup.
5. Mount the restored database (Mount-Database). Omit this step if the database was mounted automatically in the previous step.
6. Verify the health of the storage group before you update or reseed to replicated database copies.
7. Update or reseed replicated storage group on all passive nodes (Update-StorageGroupCopy).
8. If necessary, make the mailbox server active that hosts the restored storage group (Move-ClusteredMailboxServer).
9. Check the health of the CCR copies (Get-ClusteredMailboxServerStatus).

Restoring a Database Availability Group database copy backup on Exchange Server 2010

Perform these steps to restore a replicated database copy backup in a Database Availability Group (DAG). This procedure assumes that you have already backed up your database.

Use the Management Console or the Management Shell to input commands as detailed in the parentheses.

To restore a Database Availability Group database copy backup:

1. Make the database active on the server that you want to host the restore (Move-ActiveMailboxDatabase).
2. Suspend replication of all passive copies of the database (Suspend-MailboxCopy).
3. Unmount the active mailbox database (Dismount-Database).
4. Stop the replication service on the system that you want to perform the restore. Do this step only for a VSS Instant Restore operation.
5. Restore the database and logs using the Tivoli Storage FlashCopy Manager command line or Management Console.

   Restriction: The database must not be mounted automatically after the restore. If using the Management Console, ensure that the **MountDatabasesAfterRestore** option is set to **False** in the Restore panel, you must clear it. If using the command line, the **/mountdatabases** restore option must be set to NO.
6. If not performed in Step 5, start the replication service first before mounting 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.
8. Update or reseed all replicas (Update-MailboxDatabaseCopy). This step avoids potential transaction log synchronization problems that might arise if replication were resumed directly.
9. Move the active database to the server that you want (Move-ActiveMailboxDatabase).

Automating tasks

This section explains how to use the Automate view to work with commands. It shows how to save commands and schedule the running of commands.

You can use the Automate view to create, save, store, and schedule commands. Open the Automate view by selecting a workload that you want to work with and clicking **Automate** tab. When you enter commands in the bottom details pane, the output of the command is displayed in the top results pane. You can click the **Tips** button to display tips on how to use the Automate view.

1. Type a command in the details pane and click the **Execute** icon to run the command. You can also run a saved task by clicking the **Open** icon, selecting the command file, and clicking the **Execute** icon.

   The commands can be entered without `fcmcli`. For example, for each selected workload instance, you can enter a single command or multiple commands, such as:

```
q component
q backup
```

2. Click the **Save** icon and follow the prompts to save a command for future use.
3. 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.
4. The output of the command is displayed in the results pane. The output can be saved or sent to an email address.

Additional automation methods

This section explains how to automate your commands from other views in the Management Console.

You can automate your commands from the Protect, Recover, Schedule, and Task List views.

1. Start the Management Console and select the appropriate workload in the tree view.
2. Click the appropriate tab for the task (**Protect** or **Recover**).
3. Automate the command by using one of the following methods:
   - Result Pane

     Select the objects for your task in the result pane, then select **Run Scheduled** in the toolbar drop-down menu. Click the appropriate task in the **Action** pane. When the schedule wizard starts, enter the information for each prompt in order to create a scheduled task.
   - Task List Pane

     When a task has been 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 in order to create a scheduled task.

Protecting SQL Server data with IBM Tivoli Storage FlashCopy Manager for Windows

Information is provided regarding how to use IBM Tivoli Storage FlashCopy Manager for Windows to protect SQL Server data.

Security

Data Protection for SQL requires certain settings in order to perform operations in a secure environment.

Windows administrator authority is required for installation. Data Protection for SQL must be registered to the Tivoli Storage Manager server and the appropriate node name and password must be used when connecting to the Tivoli Storage Manager server. In addition, standard Tivoli Storage Manager security requirements apply to Data Protection for SQL.

Three options are provided when specifying SQL Server logon information:

- Accept the default `sa` account and blank 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 let Windows authenticate the logon.

Note: The SQL logon user or Windows user name must be added to the SQL Server SYSADMIN fixed server role before it can be used by Data Protection for SQL.

Backing up SQL Server databases

Perform these tasks to back up SQL server databases by using Microsoft Volume Shadow Copy Service (VSS) technology.

Before you begin, review Security requirements.

To back up SQL Server databases by using the VSS method:

1. Start the Management Console.
2. Click **Protect Data** in the welcome page.
3. In the **Protect** tab of the SQL instance, specify the type of SQL data to back up:
   - Select **View: Databases** for a list of discovered SQL databases that are available for backup.
   - Select **View: Files** for a list of discovered SQL database files that are available for backup.

   Use the results pane to browse and select the databases or files to back up.

   Tip: Fine tune the list of available storage groups or databases in the results pane by entering a keyword in the **Search** field.
4. Verify backup options. If the backup options are not currently displayed, click **Show Backup Options**.
5. Click **Backup Method** in the Actions pane and select **VSS**.
6. Optional: Select the **Backup Destination** in the Actions pane.

   For the Tivoli Storage Manager configuration, you can select **Local**, **TSM**, or **Both**. For the stand-alone configuration, the only available backup destination is **Local**.
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.
8. Create the backup by clicking **Full Backup** in the Actions pane. If **Run Scheduled** is selected, the schedule wizard starts. Follow the wizard prompts to create a scheduled backup task. You can also right-click a database, and select the backup action you want from the context-menu.

Related tasks

"Restoring SQL Server data" on page 81

"Deleting SQL Server backups" on page 81

Deleting SQL Server backups

Perform these steps to delete an SQL Server backup that was created with the VSS backup method.

Attention: Do not use this procedure for typical delete tasks as backups are deleted automatically, based on user-defined policy management settings. This procedure is necessary for those deletions that are outside the scope of standard policy management deletions. Perform this task with caution and only as a last resort.

To delete an SQL Server backup:

1. Start the Management Console.
2. Click **Recover Data** in the welcome page.
3. In the **Recover** tab for the SQL instance, select one or more VSS database backups to delete.
4. Click **Delete backup** in the **Action** pane to delete the selected database backups.

   Attention: Upon completion of a delete backup operation, the view content refreshes and all object selections are cleared.

For special considerations about multiple backups on space-efficient target volumes with SAN Volume Controller and Storwize V7000, see "Using space-efficient target volumes with SAN Volume Controller and Storwize V7000" on page 11.

Restoring SQL Server data

This procedure describes how to restore SQL data.

Before you begin, review these topics:

- "Restore considerations" on page 85
- Security requirements

Attention: When you restore a database, existing data is overwritten by the restored data and is no longer available after the restore is complete.

To restore SQL Server data:

1. Start the Management Console.
2. Click **Recover Data** in the welcome page.
3. In the **Recover** tab for the SQL instance, specify the type of SQL data to back up:select one or more databases to restore.
   - Select **View: Databases** for a list of discovered SQL databases that are available for restore.
   - Select **View: Files** for a list of discovered SQL database files that are available for restore.

   Use the results pane to browse and select the databases or files to restore.

   Tip: Fine tune the list of available databases or files in the results pane by entering a keyword in the **Search** field.
4. Verify restore options. If the restore options are not currently displayed, click **Show Restore Options**. For details about the restore options, see 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.

6. Click **Restore** or **Restore to Alternate location** in the Actions pane to initiate the restore operation. Click **PIT Restore Settings** to specify a point in time to restore a specific version of a database. If **Run Scheduled** is selected, the schedule wizard starts. Follow the wizard prompts to create a scheduled restore task.

Related tasks

"Backing up SQL Server databases" on page 80

"Deleting SQL Server backups" on page 81

Restore options

Descriptions of the options available in the Data Protection for SQL GUI restore windows are provided.

From the Recover tab, click the **Show Restore Options** to modify the default restore options.

AutoSelect

Set this option to **True** to enable auto-selection. With auto-selection, when you select the most recent backup to restore, all other necessary backups are automatically selected for you, up to the previous full backup.

Stripes

Under Performance, the number of **Stripes** is listed. You can 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. To change the Stripes value on the default 1 and type in the new number. The value you enter should correspond to the value set for SQL buffers. Note that this option is always enabled for Legacy backups. Stripes are not available for VSS backups.

Database Owner Only

Under Restore Behavior, **DbOwnerOnly** is listed with a default value of False. You can mark a database for owner use only by changing this value to True. The default is not to mark for owner use. This option is always enabled and applies to Legacy restores only.

Instant Restore

Under Restore Behavior, **InstantRestore** is listed with a default value of **True**. You can disable Instant Restores by setting the value to **False**, which bypasses volume-level copy and uses file-level copy to restore the files from a local VSS Backup. If this option is set to **True**, the volume level snapshot restore is used for local VSS Backups if the backup exists on SAN-attached volumes. The default value is to use **volume level snapshot restore** if it is supported. This option is available for VSS operations only. When performing VSS Instant Restores, a best practice is to make sure that any previous background copies (that involve the volumes being restored) are completed prior to initiating the VSS Instant Restore.

Attention: Instant Restore overwrites all files on the destination file system.

Recovery

Under Restore Behavior, **Recovery** is listed with a default value of False.

Change this option to True to allow the Data Protection for SQL to run a recovery after the restore operation has succeeded.

Replace
Under Restore Behavior, **Replace** is listed with a default value of False. Change this value to True if you want to replace a database during a restore. The default is not to replace databases. This option applies to Legacy restores only.

Smart Select
Under Performance, **SmartSelect** is listed with a default value of False. Change this value to True if you want to enable the smart select capability.

Stand By Undo File Name
Under Restore Behavior, **StandByUndoFileName** is listed with a default value of False. Use this option to specify the undo file path for a Legacy restore to a standby SQL database. It changes the target SQL database in to standby mode.

Wait for Tape Mounts for Restore
Under Tape, you can specify whether or not the Data Protection for SQL restore operation waits for the Tivoli Storage Manager server to mount removable media such as tapes or DVDs. This information is retrieved from Tivoli Storage Manager when you click the Recover tab, or select the Refresh button. The default value is True.

Wait for Tape Mounts for File Information
Under Tape, **WaitForTapeMountsForFileInformation** is listed with a default value of True. When querying Tivoli Storage Manager for file information, you can specify whether or not Data Protection for SQL waits for the Tivoli Storage Manager server to mount removable media. This option applies to Legacy restores only.

From the **Restore Databases** view, the following additional options are available:

Point in Time
You can specify a point in time to which to restore a database if desired by clicking the **Point in Time** button. This button is enabled only when you select for restore a **full** backup object and at least one **log** backup.

Point in Time Dialog

Clicking on the Point in Time button displays a dialog box with the following options:

- No point in time
- Stop at
- Stop at mark
- Stop before mark

The **stop** radio buttons allow you to specify a date and time. With **Stop at mark** and **Stop before mark**, you can name a mark for the restore and include the date and time to help locate the mark.

To clear a point in time that is set, select the **No point in time** radio button.

When **point in time** is in use, a static field is enabled to display the results of the action.

Shortcut Menu: You can display additional restore options by right-clicking a selected item in the list control. From the **Restore Groups/Files** tab, this menu is available only when you highlight a database in the tree. All of its backup objects will be displayed in the list control, and the menu will be available for any selected objects. The right-click popup menu contains the following items:

Restore Into

Use this option to specify the database to restore a backup object to. Click **Restore Into** to display an edit box. If you have selected several databases to be restored, the **Restore into** name you specify applies only to the selected backup object that you right-clicked. If other selected backups require the ***Restore into*** parameter, you will have to specify them one at a time, but you can do this in one restore operation.

Relocate

Use the Relocate dialogs to specify new destination locations in which to restore backed up SQL databases, logs, and SQL Server full-text index files (SQL Server 2005) or FILESTREAM files (SQL Server 2008 and SQL Server 2008 R2):

- *Relocate All Files Into a Directory*: Select this option to restore the SQL data files, logs, and other related files into a location different from where the data was originally backed up.
  - *Relocate Log Files Into*: Check this box to restore the log files into a location different from where the SQL database and other related files are being restored.
  - *Relocate Other Files Into*: Check this box to restore SQL Server full-text index files (SQL Server 2005) or FILESTREAM files (SQL Server 2008 and SQL Server 2008 R2) into a location different from where the SQL database and logs are being restored.
- *Relocate Files Individually*: Select this option to restore each SQL database, log, and SQL Server full-text index file (SQL Server 2005) or FILESTREAM files (SQL Server 2008 and SQL Server 2008 R2) individually. This is available for Legacy backups only.

Standby Server Undo File

Use this option to specify the undo file for a Legacy restore to a standby SQL database. If the target SQL database is not already in standby mode, it will be placed in standby mode. This menu item appears only in the **Restore Databases** window and is available for full, differential, and log backup types, but only for one database at a time. Click this option to display an edit box for the undo file name. Once you specify this for a database, it applies to all backup objects for that database. Likewise, once you remove this option for a backup object, it is removed for all.

Note that the MMC GUI does *not* support the ***/relocate.../to*** or ***/relocatedir*** parameters for partial restores. You must use the command line interface when performing a partial restore that requires these parameters.

Restore considerations

Considered these characteristics before performing a restore operation.

Unless otherwise specified, *restore* refers to the VSS restore types VSS Fast Restore and VSS Instant Restore. A restore operation requires that you be aware of these factors:

- VSS restore of the master database (`msdb`) must be performed offline. Therefore, the associated SQL Server instance must be stopped before performing the restore. Attempting to restore a master database that is online will fail. Such an attempt can also disable subsequent VSS Backup and VSS restore operations until the SQL Server VSS Writer service is restarted.
- A VSS Instant Restore overwrites the entire contents of the source volumes. However, you can avoid overwriting the source volumes by setting the **Instant Restore** option to **False**. This option bypasses volume-level copy and uses file-level copy instead. For best results, ensure that the source volume contains only the SQL database.
- When performing a VSS Instant Restore, there is no check to verify that any other data (including other SQL databases specified for restore) is present on the volume. Before performing a VSS restore operation that uses the VSS Instant Restore function, verify that there is no other data on the volumes being restored. If you want to avoid overwriting the source volumes, or if you are restoring a single database from a VSS Backup that is located on local VSS shadow volumes that contain more than one database, make sure to set the **Instant Restore** option to **False**.
- VSS Instant Restore requires that the local disk is not being accessed by other applications such as Windows Explorer.

Related tasks

"Backing up SQL Server databases" on page 80

"Restoring SQL Server data" on page 81

"Deleting SQL Server backups" on page 81

"Setting user preferences" on page 45

Inactivating SQL databases (Legacy only)

Use these tasks to inactivate an existing legacy backup of SQL databases.

Use the **Inactivate** action to make an SQL database backup **Inactive** on the Tivoli Storage Manager server. Typical backups do not require this command as Tivoli Storage Manager inactivates an SQL database backup as a part of Tivoli Storage Manager policy management. As a result, backup objects are typically inactivated as part of the scheduled backup processing.

For cases when automatic processing is not sufficient, the inactivate function explicitly inactivates one or more active backup objects on the Tivoli Storage Manager server. As with backup and restore, use Data Protection for SQL to select any or all of six backup object types for operation: full, differential, log, file, group, or set for legacy backups. In addition, it is possible to inactivate any object or object type older than a specified number of days.

Use the inactivate window to inactivate a legacy backup of an SQL database on the Tivoli Storage Manager server.

Note: The SQL database that you want to inactivate must be a Legacy backup. VSS backups cannot be inactivated by using this method. The **Inactivate** action in the Actions pane is not available for VSS backups.

To inactivate backup objects:

1. Select the SQL server under the **Protect and Recover Data** node in the tree view.
2. Open the **Recover** view to see the status of the backup. It is displayed as an active backup.
3. If you must inactivate this backup, select the database backup and click **Inactivate** from the Actions pane.
4. Click **All Backups** on the toolbar to display the database that you have made inactive. Click **Active Backups** on the toolbar to display only active backups.

Automating tasks

This section explains how to use the Automate view to work with commands. It shows how to save commands and schedule the running of commands.

You can use the Automate view to create, save, store, and schedule commands. Open the Automate view by selecting a workload that you want to work with and clicking **Automate** tab. When you enter commands in the bottom details pane, the output of the command is displayed in the top results pane. You can click the **Tips** button to display tips on how to use the Automate view.

1. Type a command in the details pane and click the **Execute** icon to run the command. You can also run a saved task by clicking the **Open** icon, selecting the command file, and clicking the **Execute** icon.

   The commands can be entered without `fcmcli`. For example, for each selected workload instance, you can enter a single command or multiple commands, such as:

   ```
   q component
   q backup
   ```
2. Click the **Save** icon and follow the prompts to save a command for future use.
3. 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.
4. The output of the command is displayed in the results pane. The output can be saved or sent to an email address.

Additional automation methods

This section explains how to automate your commands from other views in the Management Console.

You can automate your commands from the Protect, Recover, Schedule, and Task List views.

1. Start the Management Console and select the appropriate workload in the tree view.
2. Click the appropriate tab for the task (**Protect** or **Recover**).
3. Automate the command by using one of the following methods:
   - Result Pane

     Select the objects for your task in the result pane, then select **Run Scheduled** in the toolbar drop-down menu. Click the appropriate task in the **Action**

pane. When the schedule wizard starts, enter the information for each prompt in order to create a scheduled task.

- Task List Pane

  When a task has been 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 in order to create a scheduled task.

Protecting custom application and file system data with IBM Tivoli Storage FlashCopy Manager for Windows

Use Tivoli Storage FlashCopy Manager to create VSS snapshot backups of NTFS file systems and applications such as Lotus Domino Server. If you are backing up an application, you might need special permissions to access the application data. Refer to the documentation for the application that you are protecting. For example, see the README.DOMINO.TXT located in the Tivoli Storage FlashCopy Manager installation directory.

Backing up custom application and file system data

Perform these tasks to back up custom application and file system data by using Microsoft Volume Shadow Copy Service (VSS) technology.

To back up custom application and file system data:

1. Start the Management Console.
2. Click **Protect and Recover Data** > **File System** in the tree view.
3. In the **Protect** tab, select the volume names and mount points to back up.

   Tip: Fine tune the list of available volume names and mount points in the results pane by entering a keyword in the **Search** field.
4. Click **Show Backup Options** and specify the complete path for a presnapshotcmd file or postsnapchotcmd file to use.

   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 postsnapchotcmd 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.

   These options are not required. If you use them, however, you must specify a fully qualified path designation.
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 will start, complete with the appropriate command that is required to complete the task.
6. In the **Action** pane, click **Full Backup**. View the backup progress in the Task List or Task Details panel.

Deleting custom application and file system backups

Perform these steps to remove a custom application or file system VSS backup object.

Do not use this procedure for typical delete tasks as VSS Backups are automatically deleted based on user-defined policy management settings. This procedure is necessary for those deletions that are outside the scope of standard policy management deletions. In addition, this task must be performed with caution and only as a last resort.

To delete custom application and file system VSS backups:

1. Start the Management Console.
2. Click **Protect and Recover Data** > **File System** in the Management window.
3. In the **Recover** tab, select the volume name or mount point to delete. You are not deleting the volume or mount point, you are deleting the backup version of the volume or mount point. To view both active and inactive backup objects, click **Active Backups**. To view only active backup objects, click **All Backups**.
4. Right-click on the volume or mount point and click **Delete Backup** in the menu or click **Delete Backup** in the Actions pane. A dialog opens asking you to confirm the deletion.
   - Click **Yes** to delete the volume.
   - Click **No** to stop the deletion process.

   Attention: When you click **Delete backup**, two tasks are displayed in the Task List. One for the delete operation and one for the refresh. The Task List will not refresh until after both tasks have completed. At completion of the delete backup operation, the view content refreshes and all object selections are cleared.

For special considerations about multiple backups on space-efficient target volumes with SAN Volume Controller and Storwize V7000, see "Using space-efficient target volumes with SAN Volume Controller and Storwize V7000" on page 11.

Restoring custom application and file system data

Perform these tasks to restore custom application and file system data.

Before you begin, IBM Tivoli Storage FlashCopy Manager must be configured to manage VSS snapshots of your custom application or file system. Use the Standalone Configuration Wizard to configure IBM Tivoli Storage FlashCopy Manager for this task. Select **File System** in the wizard.

To restore custom application and file system data:

1. Start the Management Console.
2. Click **Protect and Recover Data** > **File System** in the Management window.
3. In the **Recover** tab, use the results pane to browse the volumes or mount points available for restore. The following features are available:
   - Search: Fine tune the list of available volumes or mount points in the results pane by entering a keyword in the **Search** field.
   - Filter: Use the filter options to narrow the list of volumes or mount points in the result pane.
     a. Click **Show Filter Options** and **Add Row**.

b. Click the down arrow in the **Column Name** field and select an item to filter.

   When you click **Select All**, all rows that reflect the filter specifications are selected.

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 additional items, click **Add Row**.

f. Click **Apply Filter** to filter the list of volumes or mount points.

- Backups: 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 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 you click **Refresh**, another query is run against the Tivoli Storage Manager server.

4. Click **Show Restore Options** and set a value for the following options:

   FromServer
   If the desired backup is not shown in the results pane, enter the name of the server where the original backup was performed. The default value is the current server.

   InstantRestore
   Enter `True` to use VSS Instant Restore, which applies only to snapshots that are on a disk system that supports Instant Restore. Enter `False` 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 will start, complete with the appropriate command that is required to complete the task.

6. Click the appropriate recovery action in the Action pane. Depending on the volume or mount point selected, the following actions are available in the Actions pane:

   Restore
   Restores the selected volumes or mount points to their original location.

   Restore to Point-in-Time
   Specify a point in time for which you want to restore the latest version of your volumes or mount points. When selected, you are prompted to specify a point in time to restore a specific backup version:

   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 were backed up on or before the date and time you specify, and which were 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 were backed up on or before the date and time you specify, and which were not deleted before the date and time 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.

Mount Backup
Mount the selected volume or mount point backup to a drive or NTFS folder. You can also specify a point in time for which you want to mount the latest version of your volumes or mount points.

Explore
View the subdirectories and files contained within a mounted backup. This action is available only when mounted backups exist.

Unmount Backup
Unmount the selected volumes. This action is available only when mounted backups exist.

Delete Backup
See Delete Backup.

View the restore progress in the Task List or Task Details panel. If the operation fails, you can view the error message by either clicking **Task Details** and then **Error Details**, or hovering the cursor on the selected operation.

Restore considerations

These characteristics must be considered before restoring custom application and file system data.

Unless otherwise specified, *restore* applies to both VSS Fast Restore and VSS Instant Restore. A restore operation requires that you be aware of these factors:

- A VSS Instant Restore overwrites the entire contents of the source volumes.
- A VSS Fast Restore copies all files from the snapshot to the original volume. This restore operation overwrites all data without prompting. If you do not want to overwrite all the data on the original volume, mount the snapshot and copy only the files that you want to restore.

For special considerations about multiple backups on space-efficient target volumes with SAN Volume Controller and Storwize V7000, see “Using space-efficient target volumes with SAN Volume Controller and Storwize V7000” on page 11.

Related tasks

“Backing up custom application and file system data” on page 87

“Restoring custom application and file system data” on page 88

“Deleting custom application and file system backups” on page 88

“Setting user preferences” on page 45

Automating tasks

This section explains how to use the Automate view to work with commands. It shows how to save commands and schedule the running of commands.

You can use the Automate view to create, save, store, and schedule commands. Open the Automate view by selecting a workload that you want to work with and clicking **Automate** tab. When you enter commands in the bottom details pane, the output of the command is displayed in the top results pane. You can click the **Tips** button to display tips on how to use the Automate view.

1. Type a command in the details pane and click the **Execute** icon to run the command. You can also run a saved task by clicking the **Open** icon, selecting the command file, and clicking the **Execute** icon.

   The commands can be entered without `fcmcli`. For example, for each selected workload instance, you can enter a single command or multiple commands, such as:

   ```
   q component
   q backup
   ```

2. Click the **Save** icon and follow the prompts to save a command for future use.
3. 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.
4. The output of the command is displayed in the results pane. The output can be saved or sent to an email address.

Additional automation methods

This section explains how to automate your commands from other views in the Management Console.

You can automate your commands from the Protect, Recover, Schedule, and Task List views.

1. Start the Management Console and select the appropriate workload in the tree view.
2. Click the appropriate tab for the task (**Protect** or **Recover**).
3. Automate the command by using one of the following methods:
   - Result Pane

     Select the objects for your task in the result pane, then select **Run Scheduled** in the toolbar drop-down menu. Click the appropriate task in the **Action** pane. When the schedule wizard starts, enter the information for each prompt in order to create a scheduled task.
   - Task List Pane

     When a task has been 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 in order to create a scheduled task.

Chapter 6. Troubleshooting

Diagnostic-related files and system information are displayed in a centralized location to assist with troubleshooting.

Diagnosing VSS issues

Test VSS snapshots on your system.

The VSS Diagnostics wizard performs persistent and non-persistent snapshot testing on Windows Server 2008 or later.

Attention: Do not run these tests if you are already using SAN Volume Controller or Storwize V7000 space-efficient snapshots on your computer. Doing so can result in the removal of previously existing snapshots.

Follow these steps to test persistent and non-persistent VSS snapshots:

1. Start the Management Console.
2. Click **Diagnostics** in the start page. Click the **VSS Diagnostics** icon in the action pane. The diagnostics wizard opens, a list of volumes are displayed, and the status of each test is displayed when it is completed.
3. Select the volumes or mount points to test and click **Next**. Click **Show VSS Information** to view details about the VSS providers, writers, and snapshots available on your system. Click **Next** to begin testing the selected items.
4. The results of the persistent and non-persistent snapshot testing displays as **Passed** or **Failed**. If a test fails, click on the **Failed** link for more information.

   During testing the output of the Windows event log is also displayed. Review the events and click the **Copy Info** button if you want to save the results. Click **Next** to continue.
5. The final results of the persistent and non-persistent snapshot testing display as **Success** or **Unsuccessful**.
   - If testing status is not successful, review the information displayed during testing to help isolate the issue.
   - If testing status is a success, click **Finish** and exit the wizard.

Return to the Tivoli Storage FlashCopy Manager Management Console and begin backup operations.

Collecting detailed diagnostic information

Collect detailed diagnostic information by using the Diagnostic property sheet.

A Diagnostics property page has been added to the Dashboard property sheet and to each workload instance's property sheet in the MMC GUI.

The Diagnostics property page that is available in the Dashboard property sheet is limited only to setting tracing for the MMC console and taking screen capture.

SQL, Exchange, and File System workload instance nodes are displayed in the tree view only after configuration. Therefore, you can trace the MMC GUI before completing the configuration.

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A Diagnostics property page is also available in the property sheet of each workload instance. These diagnostics property pages can control the tracing settings for all related components, including the workload, the Tivoli Storage Manager API, the Client Agent service, and the MMC GUI.

The following diagnostic modes are available:

Normal
Use for Legacy operations. Using this mode results in a small sized trace file.

Complete (default)
Use for VSS operations. Using this mode results in a large sized trace file.

Custom
Use when full control over trace flags must be set

Tooltips describe the function of each toolbar button. When tracing options are set for the agent service, the service must be restarted for the tracing to take effect.

The following steps illustrate the process flow for how to collecting diagnostic information:

1. A problem occurs in the MMC GUI.
2. Open the Diagnostics property page.
3. Optional: Select a value from the **Mode** field. The default is **Complete**.
4. Click **Begin** to set all appropriate tracing options. You can optionally 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 have finished 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.
   - For more information about the Diagnostics property page, see "Diagnostics" on page 53.
5. Close the property sheet.
6. Reproduce the problem.
7. Open the **Diagnostics** property page.
8. Click **End** to clear all tracing and gather data. Or, click **Cancel** to clear tracing without gathering data.
9. Review, copy, e-mail, and delete the problem determination data.

When a diagnostic property page collects data, it makes copies of all of the trace files, compress them, and stores them in the `FlashCopyManager\ ProblemDetermination` folder along with other information.

Online support

Integrated web content is provided in the Online Support view.

Search for the most current information regarding Tivoli Storage FlashCopy Manager product support at this website: http://www.ibm.com/software/tivoli/products/storage-flashcopy-mgr/

Enter the search term, such as an authorized program analysis report (APAR) number, release level, or operating system to narrow the search criteria for your support need.

Viewing system information

View or edit scripts that provide information about system components such as Tivoli Storage FlashCopy Manager-related Windows Services, Windows Event Log entries, and Volume Shadow Copy Service (VSS) information.

The System Information view is extensible. You can take advantage of this flexibility to add and share customize scripts.

To work with scripts, follow these steps:

1. Open the System Information view by following these steps:
   a. Click **Diagnostics** in the start 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.
   - To add your own scripts, click **New** in the Actions pane. You can also copy your scripts directly to the scripts folder in the Tivoli Storage FlashCopy Manager installation directory.

     Tivoli Storage FlashCopy Manager uses the file type extension to determine how to run the script. As a result, 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
   - To view or edit an existing script:
     a. 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 perform.
     b. Click **Command Editor** in the Actions pane to open the script file for viewing or editing.
     c. View or edit the script. Click **OK** to save your changes, or click **Cancel** to exit the System Information Command Editor without saving any changes.
   - To delete a script:

a. 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 perform.

b. Click **Delete** in the Actions pane.

Viewing trace and log files

View files that are used during troubleshooting tasks.

Tivoli Storage FlashCopy Manager uses several components. Each component is located in its own directory along with its respective troubleshooting files. The Trace and Log Files view brings these files into a central location for easy viewing. Examples including default log and trace files are provided:

- Examples of Tivoli Storage FlashCopy Manager default log and trace files:
  - Installation directory: `c:\program files\tivoli\flashcopymanager`
  - `dsierror.log`
  - `fcm.log`
  - `TraceFm.trc`
  - `TraceUx.trc`
  - `TraceManagedCapacityHistory.trc`
  - `TraceSchedLaunch.trc`
  - `VssProvisioning.log`
  - `TraceFileFS.trc`
  - `TraceFileExc.trc`
  - `TraceFileSql.trc`
- Examples of Tivoli Storage FlashCopy Manager for SQL default log and trace files:
  - Installation directory: `C:\Program Files\Tivoli\TSM\TDPSql`
  - `dsierror.log`
  - `tdpsql.log`
- Examples of Tivoli Storage FlashCopy Manager for Exchange default log and trace files:
  - Installation directory: `C:\Program Files\Tivoli\TSM\TDPExchange`
  - `dsierror.log`
  - `tdpexc.log`
- Examples of VSS Requestor default log and trace files:
  - Installation directory: `C:\Program Files\Tivoli\TSM\baclient`
  - `dsmerror.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 a Lotus Domino mail server.
- Examples of IBM VSS/VDS Hardware Provider log files:
  - `IBMVDS.log`
  - `IBMVss.log`

Click the trace or log file you want to view. The contents of the file are displayed in the bottom of the results pane. Use the toolbar icons to create, save, edit, or e-mail a file.

You can collect trace and log files in the Diagnostics property page for a workload. For more information about collecting trace and log files, see “Diagnostics” on page 53.

Chapter 7. Reference

Commands, parameters, and command-line syntax information is provided.

Command-line reference: Tivoli Storage FlashCopy Manager for Exchange

The name of the Tivoli Storage FlashCopy Manager for Exchange command-line interface is **tdpexcc.exe**. If you have installed the **TDPExchange** package, or you have configured the Microsoft Exchange through the Management Console, the program will be located (by default) in the Tivoli Storage FlashCopy Manager for Exchange installation directory (`C:\Program Files\Tivoli\tsm\TDPExchange\`).

Launching the Tivoli Storage FlashCopy Manager for Exchange command-line interface

Follow these steps to launch the Tivoli Storage FlashCopy Manager for Exchange command-line interface:

1. Start the Tivoli Storage FlashCopy Manager Management Console.
2. Double-click the Exchange Server name under the **Protect and Recover Data** node.
3. In the tree view, select an Exchange node.
4. Select the Automate tab at the top of the center display to access the command-line interface on the Management Console. This is available at the bottom of the screen where you can enter your commands.

Command-line interface help

Issue the `tdpexcc ?` or `tdpexcc help` command to display help for the command-line interface.

Command-line parameter characteristics

Review these parameter characteristics before attempting a command-line operation.

- Positional parameters do not include a leading slash (/) or dash (-)
- Optional parameters can appear in any order after the required parameters
- Optional parameters begin with a forward slash (/) or a dash (-)
- Minimum abbreviations for keywords are indicated in upper case 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 appear only once per command invocation

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For help in reading syntax diagrams, refer to “Reading syntax diagrams” on page xvi.

Backup command

Use the **backup** command to perform Exchange Server backups of storage groups (Exchange Server 2007) or databases (Exchange Server 2010) 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 perform a Tivoli Storage FlashCopy Manager for Exchange backup.

Note:

- Microsoft Exchange Server considers the wildcard character (*) to be an invalid character when used in database and storage group names. As a result, database and storage groups that contain the wildcard character (*) in their name will not be backed up.
- When a full VSS snapshot backup is performed, 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. As a result, 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 running Exchange Server 2010 backups, the Exchange database file size may increase due to increase database commitments that are triggered by backup operations. This is a Microsoft Exchange server standard behavior.

See “Backup strategies” on page 19 for additional information related to the **backup** command.

Tivoli Storage FlashCopy Manager for Exchange supports the following types of VSS Backups:

Full Back up the entire storage group (Exchange Server 2007) or database (Exchange Server 2010) and transaction logs, and if a successful integrity check and backup is obtained, the Exchange Server deletes the committed log files.

Incremental
Back up the transaction logs, and if a successful backup is obtained, the Exchange Server deletes the committed log files.

Differential
Back up the transaction logs but do NOT delete them

Copy Back up the entire storage group and transaction logs, and do NOT delete the transaction logs

Attention: All databases within a storage group must be mounted at the time of the backup operation. If any database within a storage group is not mounted, the storage group is skipped and therefore, not backed up. In addition, the transaction logs will NOT be truncated.

Backup syntax

Use the **backup** command syntax diagrams as a reference to view available options and truncation requirements.

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:

*** | *componentname1, ..., componentnameN***

*
: Back up all storage groups (Exchange Server 2007) or databases (Exchange Server 2010).

componentname
: Back up the specified storage group (Exchange Server 2007) or database (Exchange Server 2010). Multiple entries are separated by commas. If separated by commas, make sure there is no space between the comma and the name. If any storage group or database name contains commas or blanks, enclose the name in double quotation marks.

The following positional parameters specify the type of backup to perform:

FULL | COPY | INCRemental | DIFFerential

FULL Back up the entire storage group or database, and the transaction logs, and if a successful backup is obtained, truncate the transaction logs.

COPY Back up the entire storage group or 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 logs but do NOT truncate them.

Attention: (Exchange Server 2007) All databases within a storage group must be mounted at the time of the backup operation. If any database within a storage group is not mounted, the storage group is skipped and, therefore not backed up. In addition, the transaction logs will NOT be truncated.

Backup optional parameters

Optional parameters follow the **backup** command and positional parameters.

/CONFIGfile=*configfilename*
Use the **/configfile** parameter to specify the name (*configfilename*) of the Tivoli Storage FlashCopy Manager for Exchange 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 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"
```

See “Set positional parameters” on page 153 for descriptions of available configuration parameters.

/EXCLUDEDAGACTive
(Exchange Server 2010) Use the **/excludedagactive** parameter to exclude the Exchange Server 2010 databases from backup if they belong to a Database Availability Group and are an active database copy.

/EXCLUDEDAGPASsive
(Exchange Server 2010) Use the **/excludedagpassive** parameter to exclude the Exchange Server 2010 databases from backup if they belong to a Database Availability Group and are a passive database copy.

/EXCLUDENONDAGDbs
(Exchange Server 2010) Use the **/excludenondagdbs** parameter to exclude the Exchange Server 2010 databases from backup if they do not belong to a Database Availability Group.

/EXCLUDEDB=*db-name1,db-nameN,...*
(Exchange Server 2010) Use the **/excludedb** parameter to exclude the specified Exchange Server 2010 databases from the backup operation. If the database names are separated by commas, make sure 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.

/EXCLUDESG=*sg-name1,sg-nameN,...*
(Exchange Server 2007) Use the **/excludesg** parameter to exclude storage groups from the backup operation. If the storage group names are separated by commas, make sure there are no spaces between the commas and the storage group names. If any storage group name contains commas or blanks, enclose the storage group name in quotation marks. Wildcard characters (*) are not supported.

/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***.

/FROMREPLica
Use the **/fromreplica** parameter if you are running in an Exchange Server 2007 Local Continuous Replication (LCR) or Cluster Continuous Replication (CCR) environment and want to back up the Exchange data from the replica copy.

Considerations

- For CCR copies, you must back up the replica copy from the secondary node of the cluster that currently contains the replica copy.
- For LCR copies, you must back up the replica copy from the same machine as the live production storage group.
- If the environment is not a CCR environment and replica does not exist, the production database is backed up.
- The default value is to not back up the replica.

/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.

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 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 using multiple simultaneous instances of Tivoli Storage FlashCopy Manager for Exchange to perform operations, use the **/logfile** parameter to specify a different log file for each instance used. This 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**
Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager for Exchange GUI or the **set** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager for Exchange command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- Make a copy of the existing log file.
- Specify a new log file with the **/logfile** parameter or **logfile** setting.

/Quiet This parameter prevents status information from being displayed. This does not affect the level of information written to the activity log.

/SKIPINTEGRITYCHECK
Specify this parameter to bypass the Exchange integrity check typically performed during a backup.

Attention: When using this parameter, it is possible that the stored backup is not valid because it is not being verified with the Exchange integrity check utility. Make sure that you have a valid backup managed by Tivoli Storage FlashCopy Manager storage.

Backup Exchange Examples

These output examples provide a sample of the text, messages, and process status that displays when using the **backup exchange** command.

In this example, the **tdpexcc backup exchange SG_G full** command performs a full backup of storage group SG_G. The following output is displayed:

```
Updating mailbox history on FCM Server...
Mailbox history has been updated successfully.

Querying Exchange Server to gather component information, please wait...

Connecting to FCM Server as node 'TAHITI1_EXC'...
Connecting to Local DSM Agent 'TAHITI1'...
Starting component backup...

Beginning VSS backup of 'SG_G'...


Performing Snapshot Operation...

Executing system command: Exchange integrity check for component 'SG_G'

VSS Backup operation completed with rc = 0.

  Elapsed Processing Time: 80.55 seconds
```

In this example, the **tdpexcc backup exchange SG_G copy** command performs a copy backup of storage group SG_G. The following output is displayed:

```
Updating mailbox history on FCM Server...
Mailbox history has been updated successfully.

Querying Exchange Server to gather component information, please wait...

Connecting to FCM Server as node 'TAHITI1_EXC'...
Connecting to Local DSM Agent 'TAHITI1'...
Starting component backup...

Beginning VSS backup of 'SG_G'...


Performing Snapshot Operation...

Executing system command: Exchange integrity check for component 'SG_G'

VSS Backup operation completed with rc = 0.

  Elapsed Processing Time: 74.95 seconds
```

In this example, the **tdpexcc backup exchange SG_G diff** command performs a differential backup of storage group SG_G. The following output is displayed:

```
Updating mailbox history on FCM Server...
Mailbox history has been updated successfully.

Querying Exchange Server to gather component information, please wait...

Connecting to FCM Server as node 'TAHITI1_EXC'...
Connecting to Local DSM Agent 'TAHITI1'...
Starting component backup...

Beginning VSS backup of 'SG_G'...


Performing Snapshot Operation...

Executing system command: Exchange integrity check for component 'SG_G'

VSS Backup operation completed with rc = 0.

  Elapsed Processing Time: 95.56 seconds
```

In this example, the **tdpexcc backup exchange SG_G incr** command performs an incremental backup of storage group SG_G. The following output is displayed:

```
Updating mailbox history on FCM Server...
Mailbox history has been updated successfully.

Querying Exchange Server to gather component information, please wait...

Connecting to FCM Server as node 'TAHITI1_EXC'...
Connecting to Local DSM Agent 'TAHITI1'...
Starting component backup...

Beginning VSS backup of 'SG_G'...


Performing Snapshot Operation...

Executing system command: Exchange integrity check for component 'SG_G'

VSS Backup operation completed with rc = 0.

  Elapsed Processing Time: 94.50 seconds
```

There will be differences in output depending on if the VSS backup is **Local** or **TSM**.

Delete Backup command

Use the **delete backup** command to delete a VSS Backup of an Exchange Server storage group (Exchange Server 2007) or database (Exchange Server 2010).

You must have local registry rights (for all versions of Exchange Server) to perform a Tivoli Storage FlashCopy Manager for Exchange delete backup.

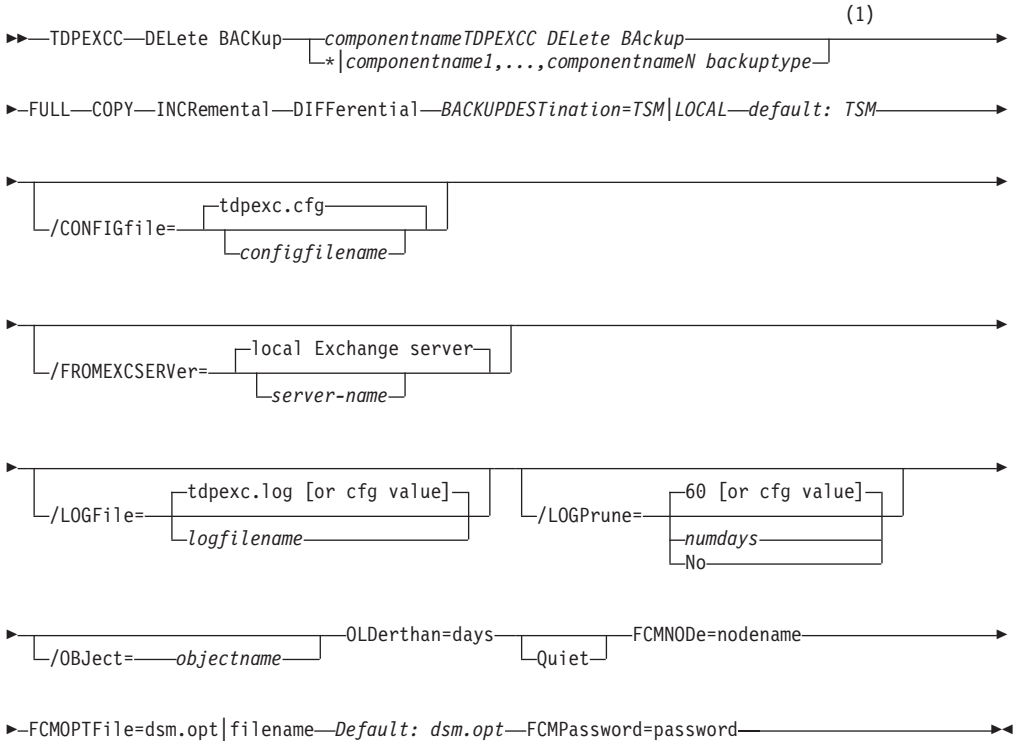
Note:

- When a full VSS snapshot backup is performed, 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. As a result, 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 appears to be associated with that newly-active full or copy backup. Also, the incremental or differential backup (associated with the previous inactive full or copy backup that has 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 them. That is, you must delete the oldest one first, followed by the second oldest, and so on. Failure to delete them in this order can cause removal of other snapshots of the same source.

See “Backup strategies” on page 19 for additional information related to the **delete backup** command.

Delete Backup syntax

Use the **delete backup** command syntax diagrams as a reference to view available options and truncation requirements.



Notes:

1 Where **componentname** can be a storage group name **sgname** (Exchange 2003 or 2007), or a database name **dbname** Exchange 2010 or later.

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:

|componentname1,...,componentnameN backuptype

* Delete the active backups of all storage groups.

componentname

Delete a backup of the specified component name, this can be a storage group name for Exchange 2007 or a database name for Exchange 2010 or later. 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, make sure 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:

- Be careful to delete only the backups that you want.
- 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 perform:

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*
Use this parameter to specify the destination of the backups to be deleted.

/CONFIGfile=*configfilename*
Use the **/configfile** parameter to specify the name (*configfilename*) of the Tivoli Storage FlashCopy Manager for Exchange 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 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"
```

See “Set positional parameters” on page 153 for descriptions of available configuration parameters.

/FROMEXCSERVer=*server-name*
Use the **/fromexcserver** parameter to specify the name of the Exchange Server where the original backup was performed.

The default is the local Exchange Server. However, you must specify the name if the Exchange Server is not the default or is a member of a MSCS or VCS.

/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.

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 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 using multiple simultaneous instances of Tivoli Storage FlashCopy Manager for Exchange to perform operations, use the **/logfile** parameter to specify a different log file for each instance used. This 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager for Exchange GUI or the **set** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager for Exchange command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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.

Use the Tivoli Storage FlashCopy Manager for Exchange **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** command. If it is not specified, the **delete** 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 to 9999. There is no default value for **/olderthan**.

/Quiet This parameter prevents status information from being displayed. This does not affect the level of information written to the activity log.

Delete Backup Example

This output example provides a sample of the text, messages, and process status that displays when using the **delete backup** command.

In this example, the **tdpexcc delete backup "First Storage Group" full** command deletes the full backup of storage group First Storage Group. The following output is displayed:

```
IBM FlashCopy Manager for Mail:
FlashCopy Manager for Microsoft Exchange Server
Version 6, Release 3, Level 0.0
(C) Copyright IBM Corporation 1998, 2011. All rights reserved.

Connecting to FCM Server ...
Connecting to Local DSM Agent ...
Backup(s) to be deleted:
 First Storage Group : VSS : full : 08/17/2011 05:59:17

VSS Delete backup operation completed with rc = 0
   Files Examined   : 1
   Files Completed  : 1
   Files Failed     : 0
   Total Bytes      : 0
```

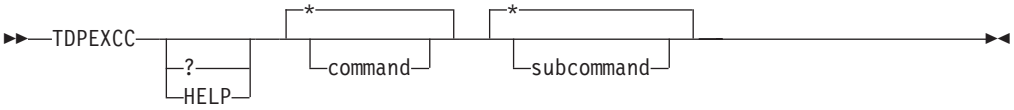
Help command

Use the **help** command to display help for Tivoli Storage FlashCopy Manager for Exchange commands.

This command lists one or more commands and their parameters. When using a non-English language, you might need to set the width of your screen display to a value greater than 80 characters in order to view 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.



Help optional parameters

Optional parameters follow the Tivoli Storage FlashCopy Manager for Exchange **help** command.

The following optional parameters specify the help to be displayed:

*|*command*

Identifies the specific Tivoli Storage FlashCopy Manager for Exchange command that is to be displayed. If the wildcard character (*) is used, help for all Tivoli Storage FlashCopy Manager for Exchange commands is displayed.

*|*subcommand*

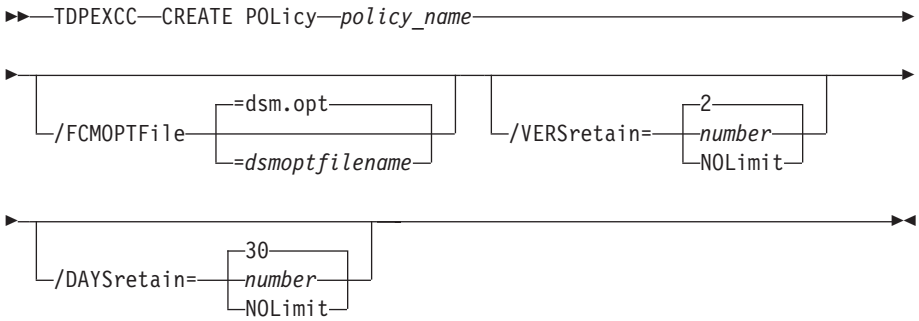
Help can be displayed for commands that have several subcommands, for

example, the **query** command. If you do not specify a subcommand or the wildcard character (*), help for all Tivoli Storage FlashCopy Manager for Exchange **query** commands is displayed.

Policy commands for Tivoli Storage FlashCopy Manager for Exchange

Create Policy

This command is used to create a new policy.

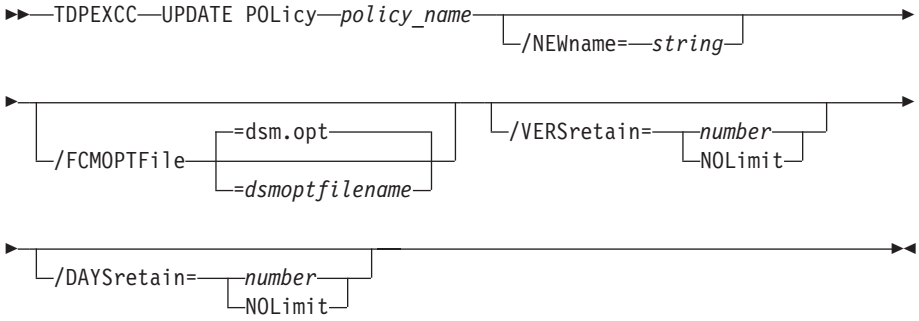


Parameters:

- **policy_name** (required): Specifies the name of the policy that is being created. In order 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.
- **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.



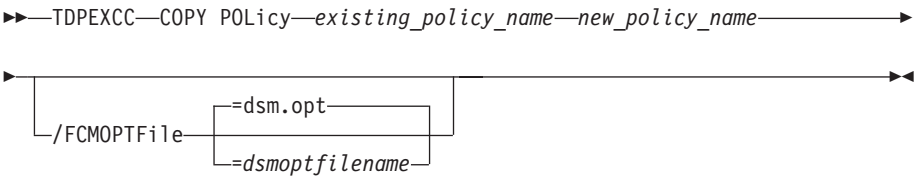
Parameters:

- **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.
- **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.



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

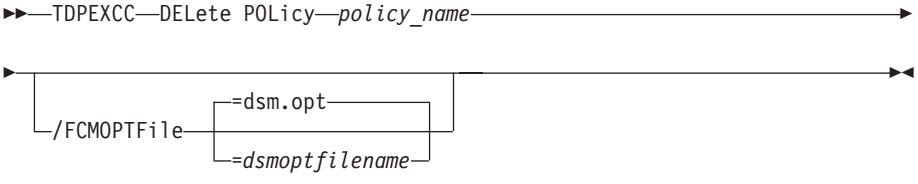
This command is used to list the attributes of a policy.

Parameters: * (required) Specifies all policies are to be queried. The results of the query will be 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.



Parameters:

- **policy_name** (required): Specifies the name of the policy 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 using the **create policy** and **update policy** commands.

In this example, the **tdpexcc create policy FCMEXCHPOL1** command creates the FCMEXCHPOL1 policy. The following output is displayed:

```
CREATE policy was successful.
```

In this example, the **tdpexcc delete policy FCMEXCHPOL1** command deletes the FCMEXCHPOL1 policy. The following output is displayed:

```
DELETE policy was successful.
```

Query Exchange command

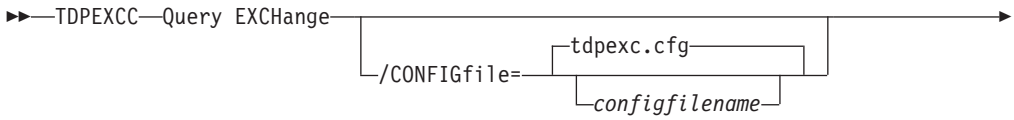
Use the **query exchange** command to query the local Exchange Server for general information.

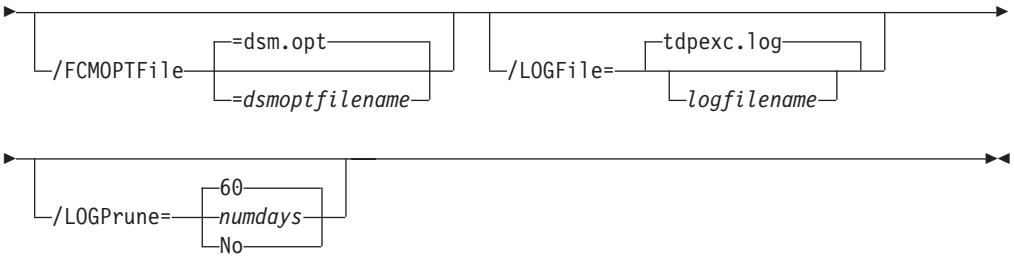
The **query exchange** command returns the following information:

- Exchange Server name and version
- Domain name
- Names of all storage groups (Exchange Server 2007) and databases
- Status (online, offline) of all storage groups (Exchange Server 2007) and databases
- Recovery Storage Group status
- Circular logging status (enabled, disabled) of all storage groups (Exchange Server 2007) or databases (Exchange Server 2010)
- 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.





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 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 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"
```

See “Set positional parameters” on page 153 for descriptions of available configuration parameters.

/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*

Use the **/logfile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager for Exchange. 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 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 using multiple simultaneous instances of Tivoli Storage FlashCopy Manager for Exchange to perform operations, use the **/logfile** parameter to specify a different log file for each instance used. This 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager for Exchange GUI or the **set** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager for Exchange command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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 using the **query exchange** command.

In this example, the **tdpexcc query exchange** command queried an Exchange Server named MEAN. The following output is displayed:

```
Querying Exchange Server to gather storage group information, please wait...

Microsoft Exchange Server Information
-------------------------------------

Server Name:                MEAN
Domain Name:                mean.local
Exchange Server Version:    8.0.813.0   (Exchange Server 2007)

Storage Groups with Databases and Status
----------------------------------------

2nd Storage Grp Basic
 Circular Logging - Disabled
 Replica - None
 Recovery - False
   2nd MB Multiple User                          Online
   2nd MB Single User                            Online

First Storage Group
 Circular Logging - Disabled
 Replica - None
 Recovery - False
   Mailbox Store                                 Online
   Mean Public Folders                           Online

LOGSonBASIC
 Circular Logging - Disabled
 Replica - None
 Recovery - False
   LOGSonBASIC                                   Online

stg_local
 Circular Logging - Disabled
 Replica - None
 Recovery - False
   stg_local                                     Online

svc431i_stg
 Circular Logging - Disabled
 Replica - None
 Recovery - False
   svc431i_mb                                    Online

Volume Shadow Copy Service (VSS) Information
--------------------------------------------

Writer Name           : Microsoft Exchange Writer
Local DSMAgent Node   : mean
Remote DSMAgent Node  :
Writer Status         : Online
Selectable Components : 5
```

Query FCM command

Use the **query fcm** command to display Tivoli Storage FlashCopy Manager information.

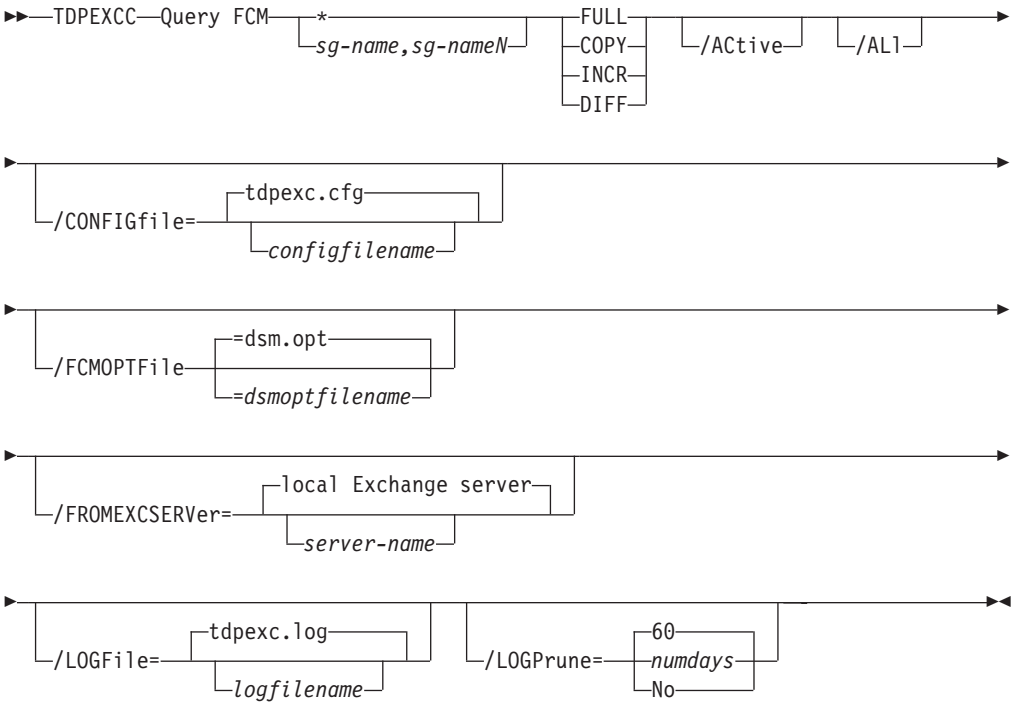
This command displays the following information:

- Compression mode
- Active policy set
- Default management class

This command can also display a list of backups that match the storage groups (Exchange Server 2007) or databases (Exchange Server 2010) entered.

Query FCM syntax

Use the **query FCM** command syntax diagrams as a reference to view available options and truncation requirements.



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 storage group name for Exchange 2007, or a database name for Exchange 2010 or later.

The following positional parameters specify the type of backup to query. If this parameter is not specified, all backup types will be 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 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 configuration file that contains the values for the Tivoli Storage FlashCopy Manager for Exchange configuration options. See "Set command" on page 152 for details about the contents of the file.

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 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.

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***.

/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***.

/FROMEXCSERVer=*server-name*
Use the **/fromexcserver** parameter to specify the name of the Exchange Server where the original backup was performed.

The default is the local Exchange Server. However, you must specify the name if the Exchange Server is not the default or is a member of a MSCS or VCS.

/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.

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 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 using multiple simultaneous instances of Tivoli Storage FlashCopy Manager for Exchange to perform operations, use the **/logfile** parameter to specify a different log file for each instance used. This 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager for Exchange GUI or the **set** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager for Exchange command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- Make a copy of the existing log file.
- Specify a new log file with the **/logfile** parameter or **logfile** setting.

Query FCM Example

This output example provides a sample of the text, messages, and process status that displays when using the **query FCM** command.

The **tdpexcc query fcm** * command displays information about the Tivoli Storage FlashCopy Manager API and Tivoli Storage FlashCopy Manager. Examples of the output are displayed below:

```
IBM FlashCopy Manager for Mail:
FlashCopy Manager for Microsoft Exchange Server
Version 6, Release 3, Level 0.0
(C) Copyright IBM Corporation 1998, 2011. All rights reserved.

Querying Tivoli Storage Manager server for a list of database backups, please wa
it...

Connecting to TSM Server as node 'TIVVM484_EXC'...


Exchange Server : TIVVM483

Database : tivvm483_db1

Backup Date          Size   S Fmt Type Loc Object Name
-------------------- ---------- - ---- ---- --- -------------------------
08/14/2011 12:27:01 21.07MB A VSS full Loc 20110814122701 (From DBCopy)

13.01MB Logs
8,256.00KB File

Exchange Server : TIVVM483

Database : tivvm484_db1

Backup Date          Size   S Fmt Type Loc Object Name
-------------------- ---------- - ---- ---- --- -------------------------
08/23/2011 18:27:00 21.07MB A VSS full Loc 20110823182700 (From DBCopy)

13.01MB Logs
8,256.00KB File
```

Detail command

Use the **/DETail** command to output information about the Tivoli Storage FlashCopy Manager and server versions.

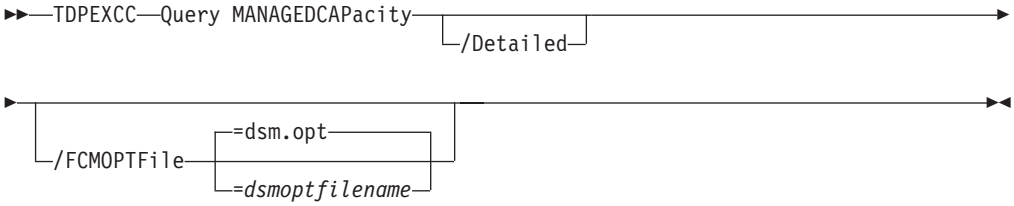
```
IBM FlashCopy Manager for Mail:
FlashCopy Manager for Microsoft Exchange Server
Version 6, Release 3, Level 0.0
(C) Copyright IBM Corporation 1998, 2011. All rights reserved.

Querying Tivoli Storage Manager server for a list of database backups,
please wait...

Connecting to TSM Server as node 'EXC_TDP'...

Exchange Server : WIN2008SP2DEV2

Backup Object Information
-------------------------

Exchange Server Name ..................... WIN2008SP2DEV2
Backup Storage Group Name ................ First Storage Group
Backup Method ............................ VSS
Backup Location .......................... Loc
Backup Object Type ....................... full
Backup Object State ...................... Active
Backup Creation Date / Time .............. 09/29/2011 15:22:31
Backup Supports Instant Restore .......... No
Backup Object Size / Name ................ 33.02MB / 20110929152231
Backup Object Size / Name ................ 25.01MB / Logs
Backup Object Size / Name ................ 8,208.00KB / Mailbox Database
```

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 represented in local inventory managed by Tivoli Storage FlashCopy Manager. This command is valid for all Windows platforms supported by Tivoli Storage FlashCopy Manager.



Parameters

/Detailed
Results in a detailed listing of snapped volumes. If this option is not specified then only the total capacity is displayed.

/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***.

In this example, the **tdpexcc query managed capacity** 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 managed capacity /detailed** command displays a detailed listing of total amount of managed capacity and the snapped volumes in use. The following output is displayed:

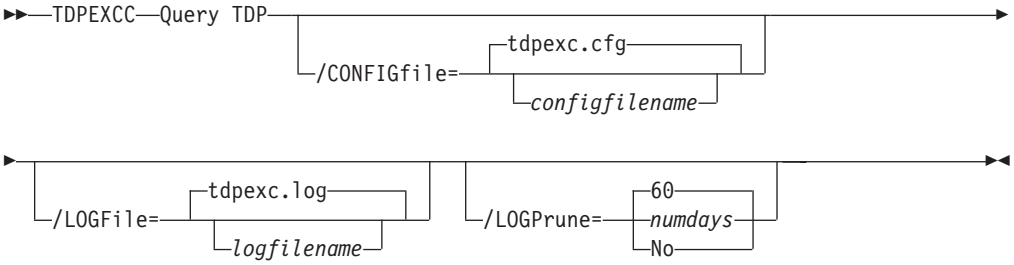
```
IBM FlashCopy Manager for Mail:
FlashCopy Manager for Microsoft Exchange Server
Version 6, Release 3, Level 0.0
(C) Copyright IBM Corporation 1998, 2011. All rights reserved.


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 set in the configuration file for Tivoli Storage FlashCopy Manager for Exchange.

Query TDP syntax

Use the **query TDP** command syntax diagrams as a reference to view available options and truncation requirements.



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 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 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"
```

See "Set positional parameters" on page 153 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 Exchange.

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 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 using multiple simultaneous instances of Tivoli Storage FlashCopy Manager for Exchange to perform operations, use the **/logfile** parameter to specify a different log file for each instance used. This 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager for Exchange GUI or the **set** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager for Exchange command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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 using the **query TDP** command.

An example of the output in a VSS configuration is displayed below.

```
IBM FlashCopy Manager for Mail:
FlashCopy Manager for Microsoft Exchange Server
Version 6, Release 3, Level 0.0
(C) Copyright IBM Corporation 1998, 2011. All rights reserved.

FlashCopy Manager for Exchange Preferences
----------------------------------------

BACKUPDESTination................... LOCAL
BACKUPMETHod....................... VSS
BUFFers ........................... 3
BUFFERSIze ........................ 1024
DATEformat ........................ 1
LANGuage .......................... ENU
LOCALDSMAgentnode.................. CENTORI
LOGFile ........................... tdpexc.log
LOGPrune .......................... 60
MOUNTWait ......................... Yes
NUMberformat ...................... 1
REMOTEDSMAgentnode..................
RETRies............................ 4
TEMPDBRestorepath..................
TEMPLOGRestorepath..................
TIMEformat ........................ 1
```

Restore command

Use the **restore** command to restore a storage group backup (Exchange Server 2007) or database backup (Exchange Server 2010) from local shadow volumes managed by Tivoli Storage FlashCopy Manager to an Exchange Server.

You must have local registry rights (for all versions of Exchange Server) to perform a Tivoli Storage FlashCopy Manager for Exchange restore.

VSS operations require special considerations that must be reviewed before attempting a VSS Restore. See these two sections for important guidelines:

- "VSS considerations" on page 126
- "Restoring VSS Backups into other locations" on page 22

When using the restore command, keep the following points in mind:

- When restoring 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 managed byTivoli Storage FlashCopy Manager storage. You can issue a **tdpexcc query fcm * /all** command to obtain a list of all the active and inactive backup objects.

Note: If the `tdpexcc restore sgname 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 storage groups (Exchange Server 2007) or databases (Exchange Server 2010).
- (Exchange Server 2007) IMPORTANT: To initiate recovery, you MUST use the **/recover** parameter when restoring the last backup object of a storage group. In addition, the value of **/templogrestorepath** should not be the same value as the current location for the storage group. If the value is the same, the storage group can become corrupted.
  - Specify `/recover=applyalllogs` to replay the restored-transaction log entries AND the current active-transaction log entries.
  - Specify `/recover=applyrestoredlogs` to replay ONLY the restored-transaction log entries. The current active-transaction log entries will NOT be replayed.

    Note: When choosing this option for a restore, your next backup MUST be a full or copy backup.

  Failure to use the **/recover** parameter when restoring the last backup set of a storage group leaves the databases unmountable.
- Specify `/mountdatabases=yes` if you are restoring the last backup set (Exchange Server 2007) or backup (Exchange Server 2010) and you want the database or databases automatically mounted after the recovery completes. Only transaction logs that are contained in the backup will be applied to the mailbox database when performing a Recovery Storage Group restore (Exchange Server 2007) or Recovery Database restore (Exchange Server 2010). You must specify ***/recover=****applyrestoredlogs* when restoring a mailbox database to a Recovery Storage Group or Recovery Database. Otherwise, the restore operation may fail.
- If you are restoring a CCR database, after the restore completes successfully, the cluster database is mounted successfully. However, due to a Microsoft Exchange Server 2007 limitation, the database resources are not brought online. You must bring the database resources online using the Microsoft Cluster Administrator interface. See the following Microsoft Knowledge Base article for details regarding this limitation: http://support.microsoft.com/kb/938442/en-us

The GUI provides an easy-to-use, flexible interface to help you perform a restore operation. The interface presents information in a way that allows multiple selection and, in some cases, automatic operation.

Note: Microsoft Exchange Server considers the wildcard character (*) to be an invalid character when used in database and storage group names. As a result, database and storage groups that contain the wildcard character (*) in their name will not be backed up.

Tivoli Storage FlashCopy Manager for Exchange 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

VSS considerations

Be aware of these considerations when performing VSS Fast Restore and VSS Instant Restores.

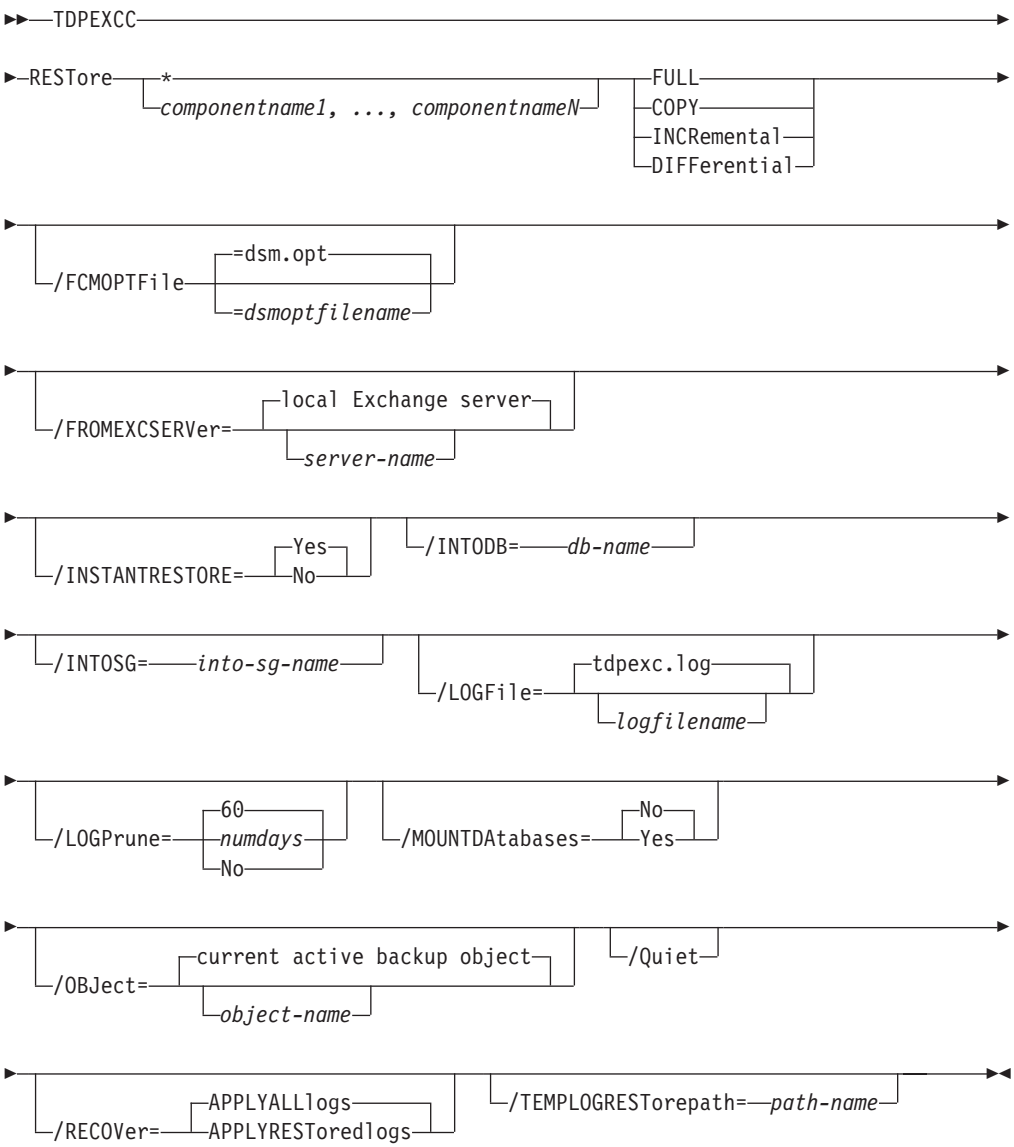
Unless otherwise specified, "VSS restores" refers to VSS Fast Restore and VSS Instant Restore:

The following characteristics are true of VSS restores:

- Full, copy, differential and incremental backup types can be restored.
- You can restore one or more storage groups (Exchange Server 2007) or databases (Exchange Server 2010) from a VSS snapshot backup located on storage managed by Tivoli Storage FlashCopy Manager.
- You can perform restores in a Microsoft Cluster Server (MSCS) or Veritas Cluster Server (VCS) environment.
- Parallel VSS Fast Restore or VSS Instant Restore operations are not supported on Microsoft Windows Server 2003 and later.
- All VSS restores of CCR and LCR replicas can only be restored into the running instance (primary, recovery, or alternate) of a storage group (Exchange Server 2007) or database (Exchange Server 2010). Microsoft does not support VSS restores into a replica instance.
- Cluster Continuous Replication (CCR) local backups can only be restored to the node that performed the backup.
- VSS restores ignore the Recovery Storage Group or Recovery Database, and are placed directly into the production database unless the ***/intosg*** parameter is specified.
- A VSS Instant Restore overwrites the entire contents of the source volumes. However, you can avoid overwriting the source volumes by specifying **/INSTANTRESTORE**=*NO*. This parameter bypasses volume-level copy and uses file-level copy instead to restore the files from a VSS Backup that resides on local shadow volumes.
- If ***/mountdatabases=****yes* is specified during a VSS restore, *all* databases in the storage group (Exchange Server 2007) or database (Exchange Server 2010) that is being restored are mounted after restore.
- If a hardware provider is used, it is recommended that the disks that contain Exchange data be configured as basic.
- Be aware that when a VSS Instant Restore from local shadow volumes is performed, the bytes transferred will display "0". When a VSS Fast Restore is performed, the bytes transferred will display the actual size.
- For guidelines on restoring into a an Exchange Server 2007 CCR or an Exchange Server 2010 DAG environment, see “VSS Instant Restore in a Cluster Continuous Replication environment” on page 76, “Restoring a Cluster Continuous Replication database copy backup on Exchange Server 2007” on page 77, and “Restoring a Database Availability Group database copy backup on Exchange Server 2010” on page 78

Restore syntax

Use the **restore** command syntax diagrams as a reference to view available options and truncation requirements.



Restore positional parameters

Positional parameters immediately follow the **restore** command and precede the optional parameters.

The following positional parameters specify the object to restore:

* | *componentname1, ..., componentnameN*

*
Restore all components sequentially. **Componentname** can be storage group (Exchange Server 2007) or database name (Exchange Server 2010 and later).

The following positional parameters specify the type of restore to perform:

FULL | COPY | INCRemental | DIFFerential

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 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 configuration file that contains the values for the Tivoli Storage FlashCopy Manager for Exchange configuration options. See "Set command" on page 152 for details about the contents of the file.

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 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..

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***.

/FROMEXCSERVer=*server-name*
Use the **/fromexcserver** parameter to specify the name of the Exchange Server where the original backup was performed.

The default is the local Exchange Server. However, you must specify the name if the Exchange Server is not the default or is a member of a MSCS or VCS.

/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 resides on local shadow volumes. The default value is **Yes**. Note that an IBM Systems Storage SAN Volume Controller, DS8000, the XIV system, or 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 that resides on local shadow volumes if the backup exists on volumes that support it. This is the default.

No Use file level copy to restore the files from a VSS Backup that resides on local shadow volumes. Note that bypassing volume-level copy means that Exchange storage group files, log files, and the checkpoint file are the only data overwritten on the source volumes.

When performing VSS Instant Restores with DS8000, Storwize V7000, SAN Volume Controller 4.2.x or 4.3.x, make sure that any previous background copies (that involve the volumes being restored) are completed prior to initiating the VSS Instant Restore. Be aware that 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.

In a CCR environment, suspend the storage group copy (Exchange Server 2007) or database copy (Exchange Server 2010) before performing the VSS Instant Restore. After the VSS Instant Restore completes, resume the storage group or database copy.

/INTODB=*db-name*

(Exchange Server 2010) Use the **/intodb** parameter to specify the name of the Exchange Server 2010 database into which the VSS Backup will be 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 will be restored, the command line entry is as follows:

```
TDPEXCC RESTore Maildb1 FULL /INTODB=RDB
```

However, when restoring a database that has been 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
```

Considerations

- There is no default value.
- In order to restore into a Recovery Database (RDB) or alternate database, an RDB or alternate database must already exist before attempting the restore operation.
- The **/intodb** parameter is only available with Exchange Server 2010 VSS restore operations.

/INTOSG=*sg-name*

(Exchange Server 2007) Use the **/intosg** parameter to specify the name of the Exchange Server 2007 storage group into which the VSS Backup will be restored. The storage group name must be specified with the *sg-name* variable. For example, if `RSG` is the name of the storage group into which the VSS Backup will be restored, the command line entry is as follows:

```
TDPEXCC RESTore STG1 FULL /INTOSG=RSG
```

However, when restoring a storage group that has been relocated (system file path, log file path, or database file path), you must specify the same

storage group name as the one you are restoring. For example, if STG1 is the name of the relocated storage group that is being restored, the command-line entry is as follows:

```
TDPEXCC RESTore STG1 FULL /INTOSG=STG1
```

Considerations

- There is no default value.
- In order to restore into a Recovery Storage Group (RSG) or alternate storage group, an RSG or alternate storage group must already exist (with the databases to be restored already added to it) before attempting the restore operation.
- The **/intosg** parameter is only available with Exchange Server 2007 VSS 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.

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 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 using multiple simultaneous instances of Tivoli Storage FlashCopy Manager for Exchange to perform operations, use the **/logfile** parameter to specify a different log file for each instance used. This 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager for Exchange GUI or the **set** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage

FlashCopy Manager for Exchange command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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 completes. You must specify one of the following values:

Yes Mount the databases after the restore operation completes.

No Do not mount the databases after the restore operation completes. This is the default.

Note that if you are restoring a CCR database, after the restore completes successfully, the cluster database is mounted successfully. However, due to a Microsoft Exchange Server 2007 limitation, the database resources are not brought online. You must bring the database resources online using the Microsoft Cluster Administrator interface. See the following Microsoft Knowledge Base article for details regarding this limitation: http://support.microsoft.com/kb/938442/en-us

/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.

Use the Tivoli Storage FlashCopy Manager for Exchange **query fcm /all** command to view the names of active and inactive backup objects.

If the `tdpexcc restore sgname 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 does not affect the level of information written to the activity log.

/RECOVER=APPLYRESToredlogs | APPLYALLlogs

Use this parameter to specify whether or not you want to run recovery after you restore an object. With Exchange Server 2007 data, it is recommended this parameter be specified on the last backup object restored for any particular storage group. To initiate recovery, you must use the **/recover** parameter when restoring the last backup object of a storage group. In addition, the value of **/templogrestorepath** should not be the same value as the current location for the storage group. If the value is the same, the storage group can become corrupted. Failure to use the **/recover** parameter when restoring the last backup set of a storage group leaves the databases unmountable. If this occurs, 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 using 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 appear in the current active-transaction log are replayed. This is the default.

APPLYRESToredlogs
Specify `/recover=applyrestoredlogs` to replay only the restored-transaction log entries. The current active-transaction log entries will not be replayed. When choosing this option for a restore, your next backup must be a full or copy backup.

When restoring multiple backup objects, the **/recover** option should 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 restoring logs and patch files. For best performance, this should 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 configuration file. The default Tivoli Storage FlashCopy Manager for Exchange 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 configuration file, the TEMP environment variable value is used.

Attention: When performing a **full** or **copy** restore operation, all log files residing in the path that is specified by the **/templogrestorepath** parameter are erased. In addition, the value of **/templogrestorepath** should not be the same value as the current location for the storage group (Exchange Server 2007) or database (Exchange Server 2010). If the value is the same, the storage group or database can become corrupted.

Restriction: Do not specify double-byte characters (DBCS) within the temporary log path.

Restore Examples

These output examples provide a sample of the text, messages, and process status that displays when using the **restore exchange** command.

In this example, the **tdpexcc restore DB7K_SVC61STD_BAS FULL /mountdatabases=Yes /recover=applyalllogs** command restores a full backup of storage group DB7K_SVC61STD_BAS, mounts the databases after the restore operation completes, and replays the restored-transaction log entries and the current active-transaction log entries. The following output is displayed:

```
IBM FlashCopy Manager for Mail:
FlashCopy Manager for Microsoft Exchange Server
Version 6, Release 3, Level 0.0
(C) Copyright IBM Corporation 1998, 2011. All rights reserved.

Starting Microsoft Exchange restore...


Beginning VSS restore of 'DB7K_SVC61STD_BAS'. This operation could take a while,
 please wait...



Preparing for restore of 'DB7K_SVC61STD_BAS' from TSM backup.

   Files Examined/Completed/Failed: [ 7 / 7 / 0 ]   Total Bytes: 147942621

VSS Restore operation completed with rc = 0
   Files Examined      : 7
   Files Completed     : 7
   Files Failed        : 0
   Total Bytes         : 147942621
   Total LanFree Bytes : 0



Recovery being run.  Please wait.  This may take a while...
```

In this example, the **tdpexcc restore DB7K_SVC61STD_BAS COPY /mountdatabases=Yes /recover=applyalllogs** command restores a copy backup of storage group DB7K_SVC61STD_BAS, mounts the databases after the restore operation completes, and replays the restored-transaction log entries and the current active-transaction log entries. The following output is displayed:

```
IBM Tivoli Storage Manager for Mail:
Data Protection for Microsoft Exchange Server
Version 6, Release 3, Level 0.0
(C) Copyright IBM Corporation 1998, 2011. All rights reserved.

Starting Microsoft Exchange restore...


Beginning VSS restore of 'DB7K_SVC61STD_BAS'. This operation could take a while,
please wait...



Preparing for restore of 'DB7K_SVC61STD_BAS' from TSM backup.

   Files Examined/Completed/Failed: [ 12 / 12 / 0 ]   Total Bytes: 153187296

VSS Restore operation completed with rc = 0
   Files Examined      : 12
   Files Completed     : 12
   Files Failed        : 0
   Total Bytes         : 153187296
   Total LanFree Bytes : 0



Recovery being run.  Please wait.  This may take a while...
```

In this example, the **tdpexcc restore svc431i_stg diff /mountdatabases=yes /recover=applyalllogs** command restores a differential backup of storage group svc431i_stg, mounts the databases after the restore operation completes, and replays the restored-transaction log entries and the current active-transaction log entries. The following output is displayed:

```
IBM Tivoli Storage Manager for Mail:
Data Protection for Microsoft Exchange Server
Version 6, Release 3, Level 0.0
(C) Copyright IBM Corporation 1998, 2011. All rights reserved.

Starting Microsoft Exchange restore...

Beginning VSS restore of 'svc431i_stg'...

Restoring 'svc431i_stg' using file-level copy from a snapshot volume.

   Files Examined/Completed/Failed: [ 15 / 15 / 0 ]   Total Bytes: 15730425

VSS Restore operation completed with rc = 0
   Files Examined   : 15
   Files Completed  : 15
   Files Failed     : 0
   Total Bytes      : 15730425

Recovery being run.  Please wait.  This may take a while...
```

In this example, the **tdpexcc restore svc431i_stg incr /mountdatabases=yes /recover=applyalllogs** command restores an incremental backup of storage group svc431i_stg, mounts the databases after the restore operation completes, and replays the restored-transaction log entries and the current active-transaction log entries. The following output is displayed:

```
IBM FlashCopy Manager for Mail:
FlashCopy Manager for Microsoft Exchange Server
Version 6, Release 3, Level 0.0
(C) Copyright IBM Corporation 1998, 2011. All rights reserved.

Starting Microsoft Exchange restore...


Beginning VSS restore of 'SG_G'. This operation could take a while, please wait...



Restoring 'SG_G' 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



Recovery being run.  Please wait.  This may take a while...
```

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 machine where **restorefiles** is run.
- Files can be restored to an alternative machine or to an alternative directory on the same machine as the Exchange Server.
- The **restorefiles** operation will fail 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 restoring 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** command.
- In a non-clustered server environment, when using the **restorefiles** command to restore local VSS backups, **backupdestination=LOCAL**, the command must be issued from the machine from which the snapshot was created.
- In a cluster disk environment, a VSS **restorefiles** command can be issued only from the active node.
- The **restorefiles** command will restore files from a VSS backup, **/BACKUPMETHOD=VSS**.

Attention:

- 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 STG1 FULL /backupmethod=vss /into=d:\temprestore
     ```

  2. Run the following command to restore the log files during the incremental restore:

     ```
     tdpexcc restorefiles STG1 INCR /backupmethod=vss /into=d:\temprestore
     ```

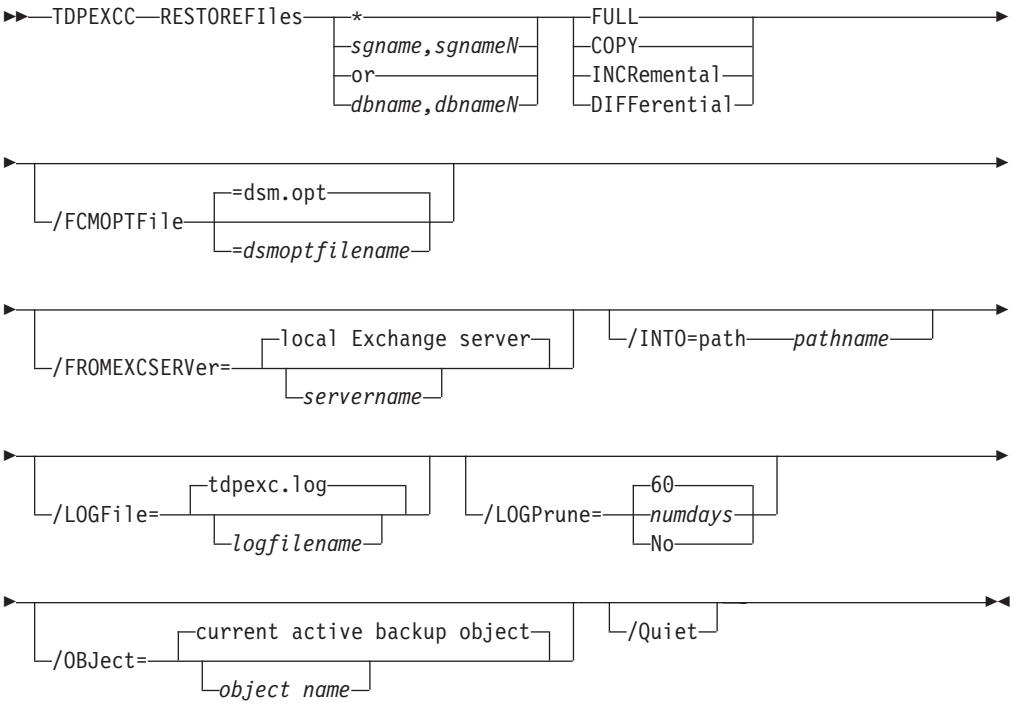
Considerations

Consider these recommendations before issuing 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 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 **restore** command syntax diagrams as a reference to view available options and truncation requirements.



Restorefiles positional parameters

Positional parameters immediately follow the **restorefiles** command and precede the optional parameters.

The following positional parameters specify the object to restore:

* | **componentname1, ..., componentnameN** *sgname*
* | **componentname1, ..., componentnameN** *dbname*

*
Sequentially restore all flat files for the storage group, or database (Exchange Server 2007, Exchange 2010).

sgname
Restore the specified storage group files (Exchange Server 2007). Multiple entries are separated by commas. If any storage group contains commas or blanks, enclose the storage group name in double quotation marks.

dbname
Restore the specified database files (Exchange Server 2010). 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 in this topic.

/CONFIGfile=*configfilename*
Use the **/configfile** parameter to specify the name of the Tivoli Storage FlashCopy Manager for Exchange configuration file that contains the values for the Tivoli Storage FlashCopy Manager for Exchange configuration options. See "Update Config positional parameters" on page 240 for details about the contents of the file.

The *configfilename* variable can include a full path. If the *configfilename* variable does not include a path, theTivoli Storage FlashCopy Manager for Exchange 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"
```

/FROMEXCSERVer=*servername*
Use the **/fromexcserver** parameter to specify the name of the Exchange Server where the original backup was performed. The default is the local Exchange Server name. If no Exchange Server is installed, the default name is the machine name.

/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 storage group (Exchange 2007) or database (Exchange 2010). Restored files are placed in that subdirectory. If the **/into** parameter is not specified, the files will be 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.

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 theTivoli Storage FlashCopy Manager for Exchange 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 using multiple simultaneous instances of Tivoli Storage FlashCopy Manager for Exchange to perform operations, use the **/logfile** parameter to specify a different log file for each instance used. This 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**
Use the **/logprune** parameter to disable log pruning, or to explicitly request that the log be pruned when the command runs. By default, log pruning is enabled and performed once per day. 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. You can use theTivoli Storage FlashCopy Manager for Exchange GUI or the **set** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager for Exchangecommand that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- Make a copy of the existing log file.
- Specify a new log file with the **/logfile** parameter or **logfile** setting.

/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.

Use the Tivoli Storage FlashCopy Manager for Exchange **query tsm** command to view the names of the backup objects.

/PARTial=*dbname1,dbnameN*
Use the **/partial** parameter to specify that only files from the named databases (*dbname1,dbnameN*) within the *full* or *copy* backup should be restored into the alternative directory.

Considerations

- This option is available for Exchange 2007 only.
- If you specify the **/partial** parameter, you must include at least one valid database name.
- If you do not specify the **/partial** parameter, all files within the backup are restored.

/Quiet This parameter prevents status information from being displayed. This does not affect the level of information written to the activity log.

/FCMOPTFile=*dsm.opt filename*
Use the *tsmoptfilename* variable to identify the Tivoli Storage FlashCopy Manager for Exchangeoptions file.

The file name can include a fully qualified path name. If no path is specified, the directory whereTivoli Storage FlashCopy Manager for Exchange is installed is searched.

If the *tsmoptfilename* variable includes spaces, enclose the entire **/dsm.opt filename** parameter entry in double quotation marks. For example:

```
/DSMOPTFile="c:\Program Files\file.opt"
```

The default is **dsm.opt**.

Restoremailbox command

Use the **restoremailbox** command to restore mailbox-level data or mailbox-item-level data from Tivoli Storage FlashCopy Manager for Exchange backups.

The following information provides details about this command:

- Use the **restoremailbox** command with Exchange Server 2007 or Exchange Server 2010.
- You can use the **restoremailbox** command with VSS Backups stored on local shadow volumes.
- Use the **restoremailbox** command or the mailbox restore operation in the GUI to restore mailbox-level data or mailbox-item-level data. The GUI also provides the Mailbox Restore Browser, an interactive action panel that lists all available mailbox actions. Some features of the **restoremailbox** command are only available on the command-line interface:
  - Use the command line interface when you must use the ***/mailboxoriglocation*** parameter to specify the server, the database, and (for Exchange Server 2007) the storage group where the mailbox was located at the time of backup.
  - Use the command-line interface for ***/tempmailboxalias*** optional parameter to specify the temporary mailbox to use when performing mailbox restore operations on mailboxes that were deleted, recreated, or moved since the time of the backup you are restoring from.
  -

    Note: Select Properties from the Actions pane to open the Data Protection for Exchange Server Properties form. 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.
- With Tivoli Storage FlashCopy Manager for Exchange you can restore multiple mailboxes with the same mailbox restore operation.
- You can use the **restoremailbox** command to restore data into a mailbox residing in an online Exchange Server or to restore data as an Exchange Server personal folders (.pst) file.
- You can use the **restoremailbox** command on the primary Exchange Server or on an alternate Exchange Server that is in the same domain.
- You can limit the range of the mailbox data to restore by using the ***/mailboxfilter*** parameter to specify filters based on these mailbox message elements:
  - Sender name
  - Folder name
  - Message body
  - Subject line
  - Attachment name
  - Range of the message delivery date and time

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

Prerequisites for Tivoli Storage FlashCopy Manager for Exchange mailbox restore tasks

Review the prerequisites before you perform mailbox restore tasks on Exchange Server 2007 or Exchange Server 2010.

- Before you start, ensure that you have sufficient privileges to restore mailboxes.
- Temporary space is needed to accommodate the mailbox database during mailbox restore operations. Specify the location of this temporary space by setting these two optional parameters in the Tivoli Storage FlashCopy Manager 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

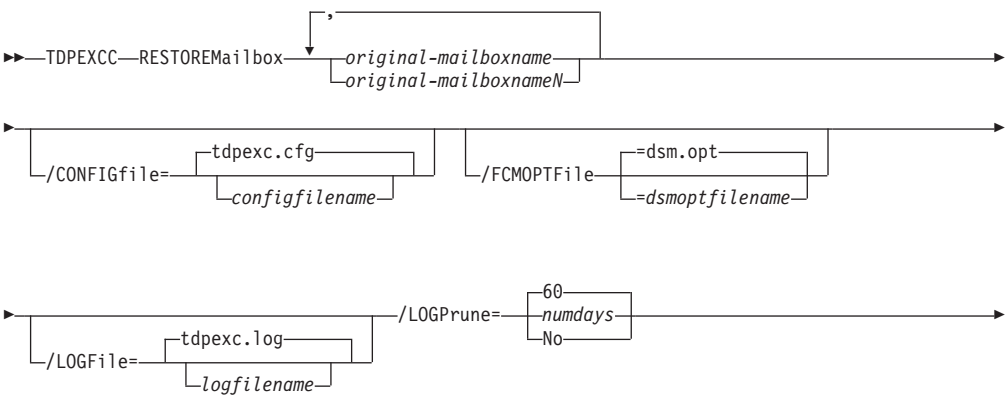
    If you choose to not enter a path, the default value of TEMPLOGRESTorepath is the value of the TEMP environment variable.

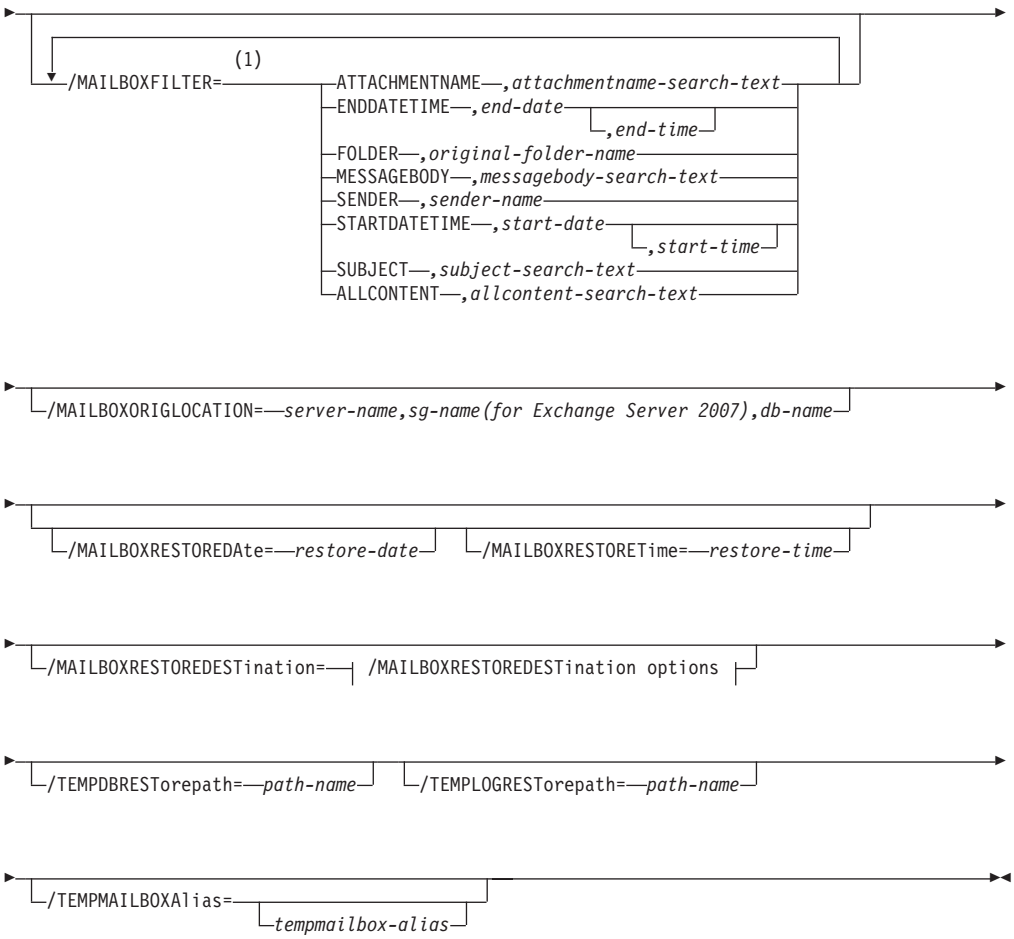
  Attention: The temporary restore locations *must* have enough space to restore the entire restored databases and log files.
- (Exchange Server 2007) Verify that Microsoft Exchange Server MAPI Client and Collaboration Data Objects 1.2.1 level 6.5.8147.0 or later is installed on the Exchange server that you will use to perform the mailbox restore operations.
- (Exchange Server 2010) Verify that Microsoft Exchange Server MAPI Client and Collaboration Data Objects 1.2.1 level 6.5.8147.0 or later is installed on the Exchange server that you will use to perform the mailbox restore operations.

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

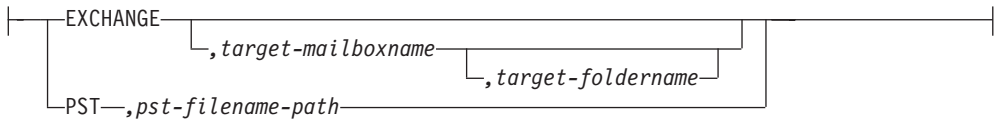
Restoremailbox syntax

Use the **restoremailbox** command syntax diagrams as a reference to view available options and truncation requirements.





/MAILBOXRESTOREDESTination options:



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 or the mailbox-display name. 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 follow the **restoremailbox** command and positional parameters.

/CONFIGfile=*configfilename*

Use the **/configfile** parameter to specify the name of the Tivoli Storage FlashCopy Manager for Exchange configuration file that contains the values for the Tivoli Storage FlashCopy Manager for Exchange configuration options. See "Set command" on page 152 for details about the contents of the file.

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 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..

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*

Use the **/logfile** parameter to specify the name of the activity log file that is generated by Tivoli Storage FlashCopy Manager for Exchange.

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 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 using multiple simultaneous instances of Tivoli Storage FlashCopy Manager for Exchange to perform operations, use the **/logfile** parameter to

specify a different log file for each instance that is used. This directs logging for each instance to a different log file and prevents interspersed log file records.

Attention: Failure to specify a different log file for each instance can result in unreadable log files.

/LOGPrune=*numdays*|**No**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager for Exchange GUI or the **set** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager for Exchange command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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.

You can specify multiple filters; however, you must specify each filter only once. For each filter that you specify, a separate /mailboxfilter parameter must be used. For example:

```
tdpexcc.exe restoremailbox dchang /MAILBOXFILTER=STARTDATETIME,07/01/2008
/MAILBOXFILTER=ENDDATETIME,07/31/2008
```

Mailbox data that matches a combination of all filters specified is restored. If no filters are specified, by default all data in the mailbox is restored.

Specify one of the following filters when using 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.

Attention: The ATTACHMENTNAME filter will not match the attachment names of encrypted mailbox messages. If a mailbox message is encrypted, it will be skipped by the ATTACHMENTNAME filter.

ENDDATETIME,*end-date[,end-time]*

Use `/mailboxfilter=enddatetime,end-date,end-time` to restore only the mailbox messages that have been 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 sent or received on that date will be restored.

FOLDER,*folder-name*

Use `/mailboxfilter=folder,original-folder-name` to restore only the mailbox messages that are located in the specified folder within the original mailbox. The match is not case-sensitive.

Enclose the *original-folder-name* variable in double quotation marks.

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.

Attention: The MESSAGEBODY filter will not match the message body of encrypted mailbox messages. If a mailbox message is encrypted, it will be skipped by the MESSAGEBODY filter.

SENDER,*sender-name*

Use `/mailboxfilter=sender,sender-name` to restore only the mailbox messages 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 have been 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 sent or received on that date will be 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 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.

Attention: The ALLCONTENT filter will not match the message body of encrypted mailbox messages. If a mailbox message is encrypted, the ALLCONTENT filter only matches text contained within the message sender or the subject line.

/MAILBOXORIGLOCATION=*server-name,sg-name(for Exchange Server 2007),db-name*

Use the **/mailboxoriglocation** parameter to specify the Exchange Server, the database, and (for Exchange Server 2007) the storage group where the mailbox resided 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 resided at the time of backup.

sg-name

The name of the storage group where the mailbox resided at the time of backup. (Exchange Server 2007 only.)

db-name

The name of the database where the mailbox resided at the time of backup.

Considerations

The **/mailboxoriglocation** parameter is only necessary if the mailbox to be restored from has been moved or deleted since the time of the backup, and no mailbox location history is available.

Attention: A restoremailbox operation from a backup taken with Tivoli Storage FlashCopy Manager for Exchange prior to version 6.1 will fail if the **/mailboxoriglocation** parameter is not specified for mailboxes that meet one or both of the following the conditions:

- The mailbox to be restored has been moved (the mailbox is not located in the same server, the same storage group (in Exchange Server 2007), and the same database where the mailbox resided at the time of backup).
- The mailbox to be restored has been deleted and the restore destination is to an alternate mailbox or to a .pst file.

For example:

```
TDPEXCC RESTOREMAILBOX annjones /MAILBOXORIGLOCATION=serv1,sg1,mbdb1
/MAILBOXRESTOREDATe=12/31/2007
/MAILBOXRESTOREDESTination=PST,c:\team99\rcvr.pst
```

```
TDPEXCC RESTOREMAILBOX annjones
/MAILBOXORIGLOCATION=serv1,mbdb1
/MAILBOXRESTOREDATe=12/31/2007
/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 taken *after* the date and time 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 options file.

If neither *restore-date* nor *restore-time* is specified, then no date and time is established. By default the mailbox will be 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 taken 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.

Notes:

- If you specify both *restore-date* and *restore-time*, this 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 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 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 taken *after* the date and time 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 options file.

If neither *restore-date* nor *restore-time* is specified, then 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 taken 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.

Notes:

- If you specify both *restore-date* and *restore-time*, this 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 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 establishes the restoration date and time as the current date at the specified *restore-time*.

/MAILBOXRESTOREDESTination=EXCHANGE|PST

Use the **/mailboxrestoredestination** parameter to specify the destination to restore the mailbox data to.

If you do not specify the **/mailboxrestoredestination** parameter, the default is to restore mailbox data to the original location in the original active mailbox. When restoring multiple mailboxes with the same **restoremailbox** command, the default is to restore mailbox data into each original active mailbox.

Mailbox items are merged into the mailbox destination. If a mailbox item already exists in the mailbox destination, that item will not be restored.

You must specify one of the following values when using this parameter:

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 restoring multiple mailboxes with the same **restoremailbox** command, this choice of options restores mailbox data into a subfolder (designated by each original mailbox-alias) of the specified target folder in an

active mailbox. In each subfolder are the folders (from the corresponding original mailbox) that contain the restored mailbox messages.

In the target mailbox, the specified folder (in the target mailbox) contains a subfolder (designated by the original-mailbox alias name). In the subfolder are sub-subfolders that contain the restored mailbox messages. These sub-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.

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.

If the mailbox folder specified by the *target-folder-name* variable does not exist in the target mailbox, a folder with the *target-folder-name* will be created in the target mailbox.

The target folder contains one subfolder for each original-mailbox that is restored (designated by each original-mailbox alias). In each subfolder are the folders from the original mailbox that contain the restored mailbox messages. If you have not specified the **/mailboxfilter** parameter, the target folder that you specified contains, within the subfolder designated by the original mailbox alias, all the folders that are in the mailbox that you are restoring from. If you have 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 restoring 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). In each subfolder are the folders from the original mailbox that contain the restored mailbox messages.

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 copied from the original mailboxes using 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,*pst-filename-path*

Use /mailboxrestoredestination=PST,*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 *pst-filename-path* variable to specify the destination where the restoremailbox operation will write the .pst file. The *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 *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
  ```

  Requirement: The .pst directory must exist before using the **restoremailbox** command. The .pst file will be 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 will be restored to the one .pst file specified. Inside the pst file, the top level folder will be the mailbox-alias-name, with the rest of the mailbox folders below it.

- You can specify *pst-filename-path* as a directory path to have Tivoli Storage FlashCopy Manager for Exchange create a .pst file using the mailbox-alias-name of the mailbox 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\
  ```

  Requirement: The .pst directory must exist before using the **restoremailbox** command. The .pst file will be created if it does not exist.

  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
```

Requirements: The .pst directory must exist before using the **restoremailbox** command.

The mailbox data that is restored using `/mailboxrestoredestination=PST,`*`pst-filename-path`* must be less than 2 GB.

If the *pst-filename-path* variable includes spaces, enclose the entire *pst-filename-path* variable entry in double quotation marks. For example:

```
TDPEXCC RESTOREMAILBOX "george clark"
  /mailboxrestoredestination=PST,"c:\mb\dept54\access group\"
```

/TEMPDBRESTorepath=*path-name*

Use the **/tempdbrestorepath** parameter to specify the default temporary path to use when restoring 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 configuration file is ***tdpexc.cfg***. If the TEMPDBRESTOREPATH value does not exist in the Tivoli Storage FlashCopy Manager for Exchange 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"
```

Attention:

- 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 storage group (Exchange Server 2007) or database (Exchange Server 2010).

Tip: For better performance, the current active-transaction logger should be on a different physical device from the paths specified by the values of the **/templogrestorepath** parameter and the **/tempdbrestorepath** parameter. The paths that are specified by the values of the **/templogrestorepath** parameter and the **/tempdbrestorepath** parameter can be on the same or separate physical devices from each other.

Restriction: 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 restoring 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 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 configuration file, the TEMP environment variable value is used.

Attention:

- Do not specify a value of **/templogrestorepath** that is the same value as the current location for the storage group (Exchange Server 2007) or database (Exchange Server 2010) used for recovery. If the value is the same, the storage group or database might become corrupted.
- Choose a temporary log-restore location that has enough space to hold all the log and patch files.

Tip: For better performance, the current active-transaction logger should be on a different physical device from the paths specified by the values of the **/templogrestorepath** parameter and the **/tempdbrestorepath** parameter. The paths that are specified by the values of the **/templogrestorepath** parameter and the **/tempdbrestorepath** parameter can be on the same or separate physical devices from each other.

Restriction: 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 will be used when performing mailbox restore operations on mailboxes that were deleted, recreated, or moved since the time of the backup you are restoring from. A temporary mailbox is used by these 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 configuration file is ***tdpexc.cfg***. If the TEMPMAILBOXALIAS value does not exist in the Tivoli Storage FlashCopy Manager for Exchange configuration file, the mailbox of the currently logged on user is used as the temporary mailbox.

Specify the following value when using this parameter:

tempmailbox-alias

Specify the mailbox-alias of the temporary mailbox to use for recovery of mailboxes that were deleted, recreated, or moved since 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.

Restore Mailbox Examples

These output examples provide a sample of the text, messages, and process status that displays when using the **restore mailbox** command.

In this example, the **tdpexcc restoremailbox userjune** command restores mailbox *userjune*. The following output is displayed:

```
IBM FlashCopy Manager for Mail:
FlashCopy Manager for Microsoft Exchange Server
Version 6, Release 3, Level 0.0
(C) Copyright IBM Corporation 1998, 2011. All rights reserved.

Starting Microsoft Exchange restore...

Querying Exchange component information...
Querying mailbox information...
Connecting to FCM Server as node 'JUNE_EXC'...
Connecting to Local DSM Agent 'JUNE'...
Preparing Exchange Recovery Storage Group...
Performing mailbox restore using closest available backup.
Connecting to FCM Server as node 'JUNE_EXC'...
Connecting to Local DSM Agent 'JUNE'...
Starting Microsoft Exchange restore...


Beginning VSS restore of 'Logs', 'MB1'. This operation could take a while,
please wait...



Restoring 'localD_STG1', 'localD_STG1' via file-level copy from snapshot(s).
This process may take some time. Please wait.

Files Examined/Completed/Failed: [ 7 / 7 / 0 ] Total Bytes: 26239825

VSS Restore operation completed with rc = 0
Files Examined : 7
Files Completed : 7
Files Failed : 0
Total Bytes : 26239825

Querying Exchange Recovery Storage Group...

Checking Active Directory entries...
Restoring mailbox 'user june (userjune)' to original location...


Mailbox restore completed successfully with 5 items restored.

Removing Exchange Recovery Storage Group...


Total mailboxes requested for restore: 1
Total mailboxes restored: 1
```

Set command

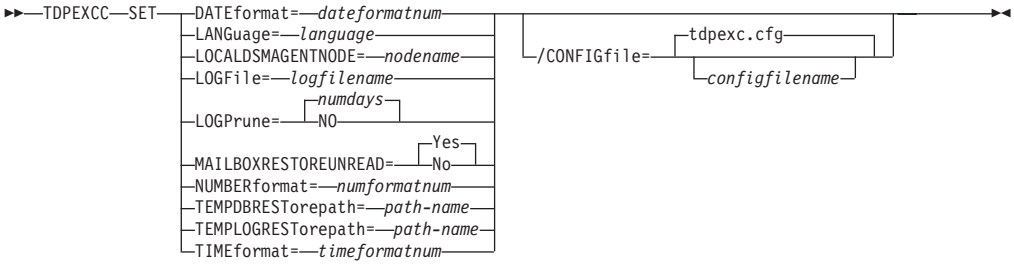
Use the **set** command to set the Tivoli Storage FlashCopy Manager for Exchange configuration parameters defined in the Tivoli Storage FlashCopy Manager for Exchange configuration file, ***tdpexc.cfg*** by default.

For command invocations other than this command or the **Configuration** task in the **Edit Menu** of the Tivoli Storage FlashCopy Manager for Exchange GUI, the value of a configuration parameter that is specified in a command invocation overrides the value of the configuration parameter that is specified in the Tivoli Storage FlashCopy Manager for Exchange configuration file. If, when you use this command, you do not override a value for the configuration file parameter, the

values in the default Tivoli Storage FlashCopy Manager for Exchange configuration file (tdpexc.cfg) are used.

Set syntax

Use the **set** command syntax diagrams as a reference to view available options and truncation requirements.



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 configuration file. You can set only one value for each **tdpexcc set** 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 is the default.

2 DD-MM-YYYY

3 YYYY-MM-DD

4 DD.MM.YYYY

5 YYYY.MM.DD

Changes to the value of the **dateformat** parameter can result in an undesired pruning of the Tivoli Storage FlashCopy Manager for Exchange log file (tdpexc.log by default). You can avoid losing existing log file data by performing one of the following:

- After changing the value of the **dateformat** parameter, make a copy of the existing log file before running Tivoli Storage FlashCopy Manager for Exchange.
- 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 American English (This 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 machine that performs 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 generated by Tivoli Storage FlashCopy Manager for Exchange. The Tivoli Storage FlashCopy Manager for Exchange 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 installation directory.

LOGPrune=*numdays* **| No**
Use the LOGPrune positional parameter to disable log pruning or to set log pruning parameters. By default, log pruning is enabled and performed once per day. The *numdays* variable represents the number of days to save log entries. You can specify a value of **No** or *0* through *9999*. By default, **60** days of log entries are saved in the pruning process.

MAILBOXRESTOREUNREAD=Yes | No
Use the **mailboxrestoreunread** parameter to specify whether to restore mailbox items as unread.

You can specify:

Yes Restore mailbox items as unread. This is the default value.

No Restore as originating message read status.

NUMberformat=*fmtnum*
Use the NUMberformat positional parameter to specify the format you want to use to display numbers.

The *fmtnum* variable displays numbers using one of the following formats. Select the format number that corresponds to the format you want to use.

1 n,nnn.dd. This is the default.

2 n,nnn,dd.

3 n nnn,dd

4 n nnn.dd

5 n.nnn,dd

6 n'nnn,dd

TEMPDBRESTorepath=*path-name*

For mailbox restore operations, use the **TEMPDBRESTorepath** positional parameter to specify the default temporary path to use when restoring 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"
```

Attention: 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 storage group (Exchange Server 2007) or database (Exchange Server 2010).

Tip: For better performance, the current active-transaction logger should be on a different physical device from the paths specified by the values of the **templogrestorepath** parameter setting and the **tempdbrestorepath** parameter setting. The paths that are specified by the values of the **templogrestorepath** parameter setting and the **tempdbrestorepath** parameter setting can be on the same or separate physical devices from each other.

Restriction: Do not specify double-byte characters (DBCS) within the temporary database-restore path.

TEMPLOGRESTorepath=*path-name*

Use the **TEMPLOGRESTorepath** positional parameter to specify the default temporary path to use when restoring logs and patch 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 TEMPLOGRESTorepath positional parameter entry in double quotation marks. For example:

```
TEMPLOGRESTorepath="c:\Program Files\templog"
```

Attention: Do not specify a value of **TEMPLOGRESTorepath** that is the same value as the current location for the storage group (Exchange Server 2007) or database (Exchange Server 2010) used for recovery. If the value is the same, the storage group might become corrupted.

Choose a temporary log-restore location that has enough space to hold all the log and patch files.

Tip: For better performance, the current active-transaction logger should be on a different physical device from the paths specified by the values of the **templogrestorepath** parameter setting and the **tempdbrestorepath** parameter setting. The paths that are specified by the values of the

templogrestorepath parameter setting and the **tempdbrestorepath** parameter setting can be on the same or separate physical devices from each other.

Restriction: Do not specify double-byte characters (DBCS) within the temporary log-restore path.

TIMEformat=*formatnumber*
Use the TIMEformat positional parameter to specify the format in which you want system time 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 HH:MM:SS This is the default.

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 Tivoli Storage FlashCopy Manager for Exchange configuration file in which these values will be set.

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 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

This output example provides a sample of the text, messages, and process status that displays when using the **set** command.

The **tdpexcc set localdsmagentnode=mean** command sets the node *mean* as the node name of the local machine that performs the backups. An example of the output is displayed below.

Specify the node name of the local machine that performs the VSS backups.

```
FMX5054I The preference has been set successfully.
```

Command-line reference: Tivoli Storage FlashCopy Manager for SQL

The name of the Tivoli Storage FlashCopy Manager for SQL command-line interface is **tdpsqlc.exe**. This program is located (by default) in the Tivoli Storage FlashCopy Manager installation directory (`C:\Program Files\Tivoli\tsm\TDPSQL`).

Launching the Tivoli Storage FlashCopy Manager command-line interface

Follow these steps to launch the Tivoli Storage FlashCopy Manager command-line interface:

1. Start the Tivoli Storage FlashCopy Manager Management Console.
2. Expand the protect and recover data node.
3. In the tree view, select a SQL Server node.
4. From the action menu, click **Launch Command Line**. A command window opens.
5. Run tdpsqlc.exe from the command prompt. The command-line interface launches.

Command-line interface help

Issue the `tdpsqlc ?` or `tdpsqlc help` command to display help for the command-line interface.

Command-line parameter characteristics

The Tivoli Storage FlashCopy Manager command line parameters have the following characteristics

- Do not include a slash or dash before positional parameters.
- Begin optional parameters with a forward slash (/) or a dash (-).
- You may place multiple optional parameters per command invocation in any order *after* positional parameters.
- You may abbreviate keywords. Minimum abbreviations are indicated in upper case in the syntax diagrams.
- All SQL names of databases or parts of databases are case-sensitive.
- Separate parameters with at least one space.
- Some keyword parameters may require a value; separate values from their keywords with an equal sign. (=).
- If a parameter's value includes spaces or special characters, enclose the value in double quotes.
- You can use positional and optional parameters only once per command invocation unless otherwise specified.

Where repeatable syntax appears, separate multiple values with commas as indicated in the following:

Use the wildcard asterisk (*) following the command to select all instances on the server of database names or file names.

For help in reading syntax diagrams, refer to “Reading syntax diagrams” on page xvi.

Backup command

Use the **backup** command to back up one (or more) SQL databases from the SQL Server to Tivoli Storage FlashCopy Manager.

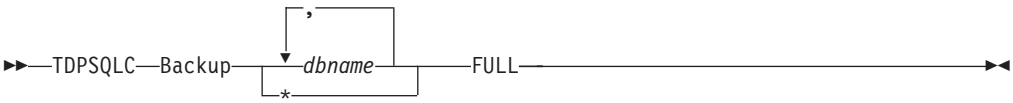
You can enter the * character to backup all databases. You can specify more than one database at once for multiple database and transaction log backups.

Considerations:

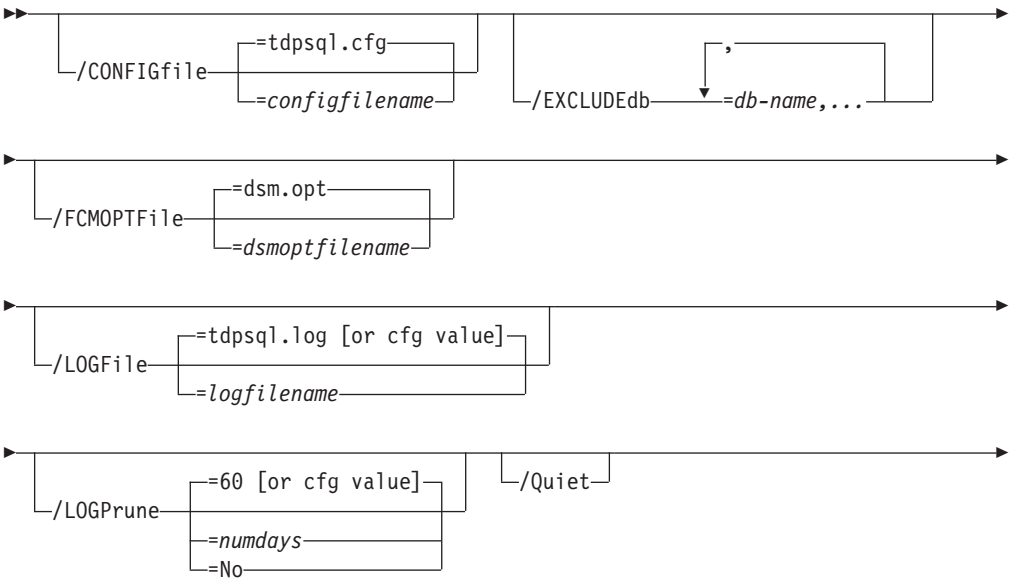
- You cannot back up or restore the **tempdb** database because it is created by SQL server each time the server is started.
- The user id used by Tivoli Storage FlashCopy Manager to log on to the SQL server must have the SQL Server SYSADMIN fixed server role.
- You can use the TRANSACT-SQL database consistency checker statement DBCC CHECKDB ('DBNAME') to verify the integrity of the SQL databases before you back them up.

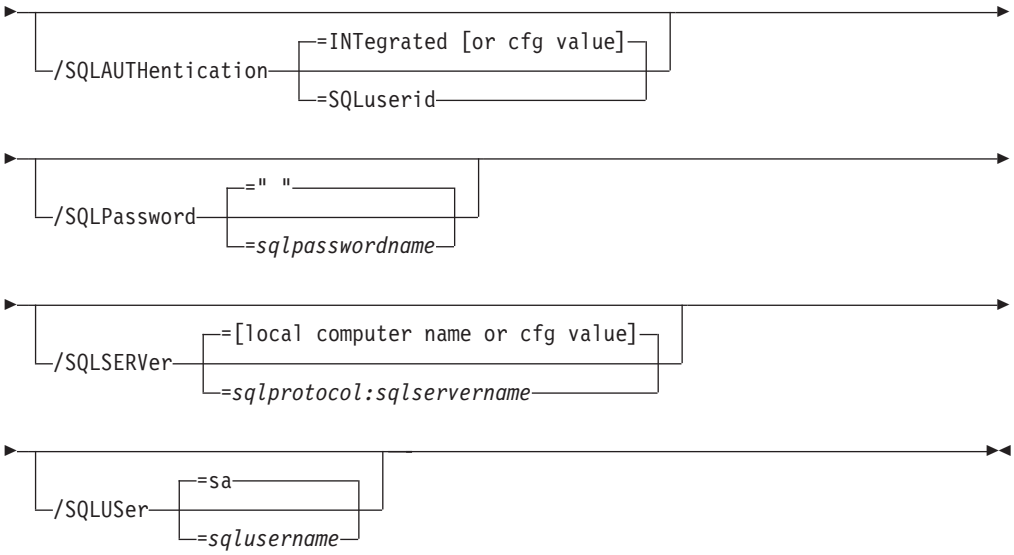
Backup syntax

Use the **backup** command syntax diagrams as a reference to view available options and truncation requirements.



Backup Optional Parameters:





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 specifying the wildcard character (*) as Microsoft warns not to back up more than a few dozen databases in a single command due to SQL Server limitations.

dbname
Back up the specified database. Multiple entries are separated by commas. If separated by commas, make sure 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 perform:

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 (SQL Server 2005), and FILESTREAM files (SQL Server 2008 and SQL Server 2008 R2).

Backup optional parameters

Optional parameters follow the **backup** 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. See “Set command” on page 194 for details on the file's contents.

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 quotes.
- If you do not specify **/configfile**, the default value is ***tdpsql.cfg***.

/EXCLUDEdb=*db-name,...*

The **/excludedb** parameter specifies the name of the databases to exclude from the backup operation.

/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 Tivoli Storage FlashCopy Manager activity logging off. If you do not specify **/logfile**, log records are written to the default log file. The default log file is ***tdpsql.log***.
- When using multiple simultaneous instances of Tivoli Storage FlashCopy Manager to perform operations, use the **/logfile** parameter to specify a different log file for each instance used. This 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**

The **/logprune** parameter prunes the Tivoli Storage FlashCopy Manager activity log and specifies how many days of entries are saved. By default, log pruning is enabled and performed once each day Tivoli Storage FlashCopy Manager is executed; however, this option allows you to disable log pruning or explicitly request a prune of the log for one command run even if the log file has already been pruned for the day. The *numdays* variable represents the number of days to save log entries. By default, 60 days of log entries are saved in the prune process.

Considerations:

- If you specify *numdays*, it can range from 0 to 9999. A value of 0 deletes all entries in the Tivoli Storage FlashCopy Manager activity log file except for the current command entries.
- If you specify **/logprune**, its value is used instead of the value stored in the Tivoli Storage FlashCopy Manager configuration file. Specifying this parameter does not change the value in the configuration file.
- Changes to the value of the **timeformat** or **dateformat** parameter can result in an undesired pruning of the Tivoli Storage FlashCopy Manager log file. If you are running a command that may prune the log file and the value of the **timeformat** or **dateformat** parameter has changed, perform one of the following to prevent undesired 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.

/Quiet This parameter prevents status information from being displayed. This does not affect the level of information written to the activity log.

/SQLAUTHentication=INTegrated | SQLuserid
This parameter specifies the authorization mode used when logging 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 will use to log on to the SQL server. This 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 will 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. 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 specified by the SQL server configurable option in the Tivoli Storage FlashCopy Manager configuration file. This 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 are a period or the word *local* within parentheses.
- If the SQL server is a member of a fail-over cluster, the CLUSTERNODE option must have the value YES.
- You must specify the name if the SQL server is not the default instance or is a member of a fail-over 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 reside on. The TCP/IP host name may not always be the same.

instancename
The name given to the named instance of SQL Server specified during installation of the instance.

virtualservername
The name given to the clustered SQL Server specified during clustering service setup. This 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.

Backup examples

These output examples provide a sample of the text, messages, and process status that displays when using the **backup** command.

In this example, the **tdpsqlc backup** command performs a full backup of database *ReportServerTempDB*. The following output is displayed:

```
IBM FlashCopy Manager for Databases:
FlashCopy Manager for Microsoft SQL Server
Version 6, Release 3, Level 0.0
(C) Copyright IBM Corporation 1997, 2011. All rights reserved.

Connecting to SQL Server, please wait...

Connecting to FCM Server as node 'SQL630_TDP'...
Connecting to Local DSM Agent 'tsm630c_node'...

Starting SQL database backup...


Beginning VSS backup of 'ReportServerTempDB'...


Performing Snapshot Operation...


VSS Backup operation completed with rc = 0.

Elapsed Processing Time: 25.73 seconds
```

Delete Backup command

Use the **delete backup** command to delete a VSS Backup of a SQL Server database.

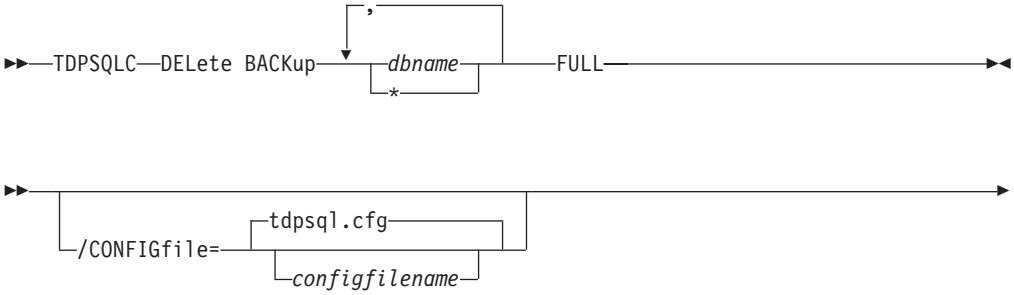
You must have local registry rights (for all versions of SQL Server) to perform a Tivoli Storage FlashCopy Manager for SQL delete backup.

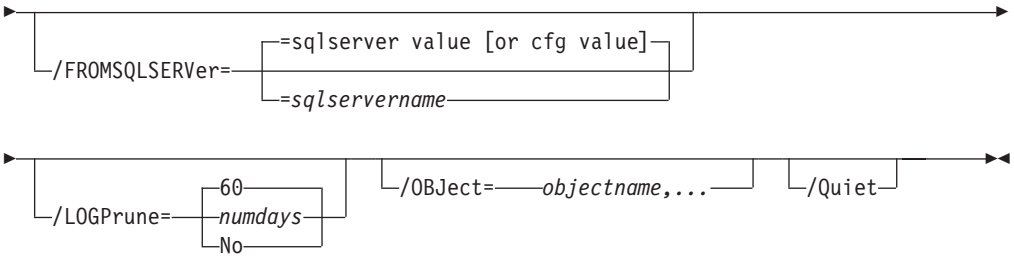
If you delete multiple LOCAL snapshots that are stored on SAN Volume Controller or Storwize V7000 Space Efficient volumes (SEV), you must do so in the same order in which you created them. That is, you must delete the oldest one first, followed by the second oldest, and so on. Failure to delete them in this order can cause removal of other snapshots of the same source.

See "Backup strategies" on page 25 for additional information related to the **delete backup** command.

Delete Backup syntax

Use the **delete backup** command syntax diagrams as a reference to view available options and truncation requirements.





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 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 perform:

FULL Delete full type backups.

Attention: Be careful to delete only the backups that you want.

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 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 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 153 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 performed. 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 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.

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 SQLinstallation 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 using multiple simultaneous instances of Tivoli Storage FlashCopy Manager for SQLto perform operations, use the **/logfile** parameter to specify a different log file for each instance used. This 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager for SQL GUI or the **set** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager for SQL command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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.

Use the Tivoli Storage FlashCopy Manager for SQL **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 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.

/Quiet This parameter prevents status information from being displayed. This does not affect the level of information written to the activity log.

Delete Backup example

This output example provides a sample of the text, messages, and process status that displays when using 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 : 02/10/2010 10:03:29>
VSS Delete backup operation completed with rc = 0
   Files Examined   : 1
   Files Completed  : 1
   Files Failed     : 0
   Total Bytes      : 0
```

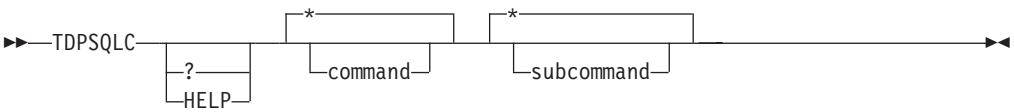
Help command

Use the **help** command to display help for Tivoli Storage FlashCopy Manager for SQL commands.

This command lists one or more commands and their parameters. When using a non-English language, you might need to set the width of your screen display to a value greater than 80 characters in order to view 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.



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 using a textual notation.

Help uses the following notation:

[*a***]** *a* is optional; *a* may occur zero or one time

{*a* **|** *b***}** select either *a* or *b*, but not both

{*a* **} +** *a* must occur at least one time

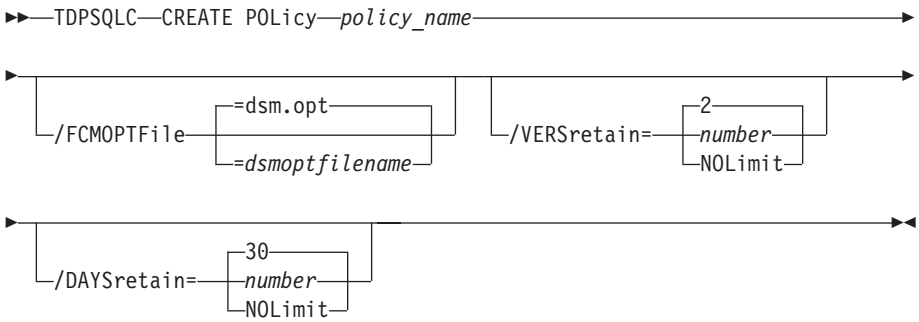
{*a* **} *** *a* may occur zero or more times

(*a***)** comments that are not part of the command

UPPERCASE
minimum abbreviation (which you can also enter in lowercase)

Policy commands for Tivoli Storage FlashCopy Manager for SQL

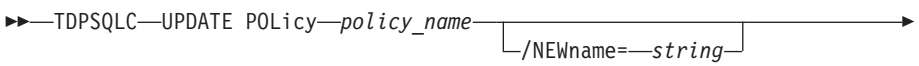
Create Policy
This command is used to create a new policy.

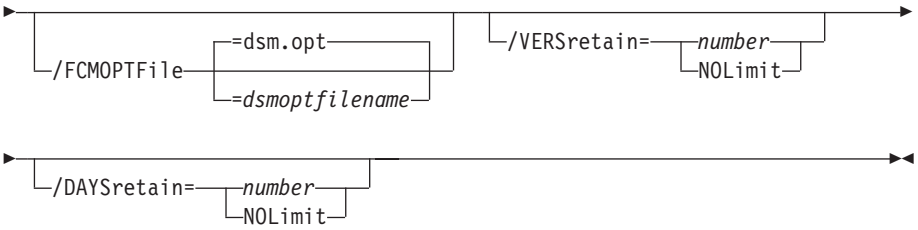


Parameters:

- **policy_name** (required): Specifies the name of the policy that is being created. In order 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.



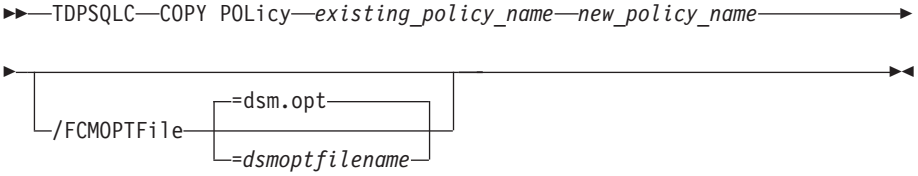


Parameters:

- **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.



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

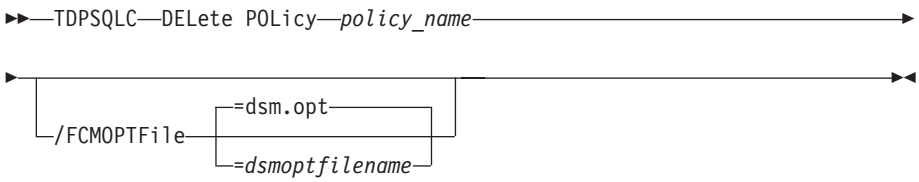
This command is used to list the attributes of a policy.

Parameters: * (required) Specifies all policies are to be queried. The results of the query will be 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.



Parameter:

- **policy_name** (required): Specifies the name of the policy 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 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.

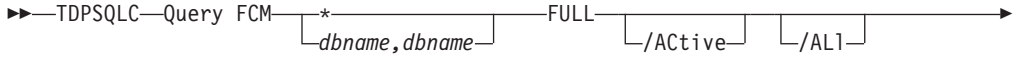
Query FCM example

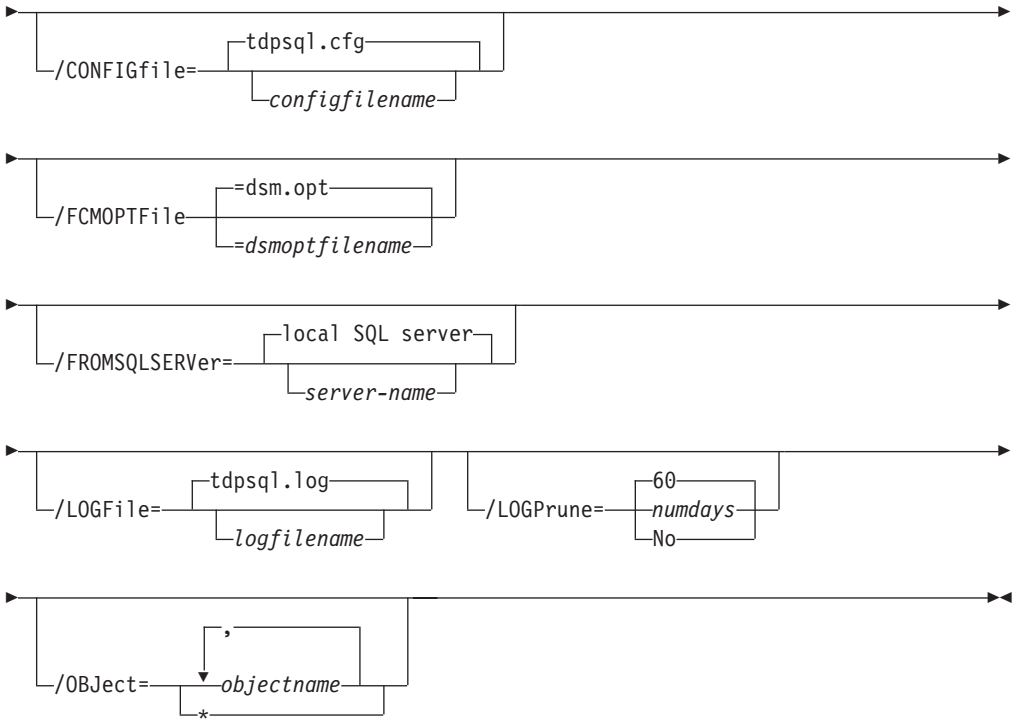
Use the **query fcm** command to return output about the server and other information:

```
Tivoli Storage Manager Server Connection Information
----------------------------------------------------

Nodename ............................... MALTA_EXC
NetWork Host Name of Server ............ FVTSERIES10
TSM API Version ........................ Version 6, Release 3, Level 0.52

Server Name ............................ FVTSERIES10_SERVER1_622GA
Server Type ............................ Windows
Server Version ......................... Version 6, Release 2, 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.





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 storage group name for Exchange 2007, or a database name for Exchange 2010 or later.

The following positional parameters specify the type of backup to query. If this parameter is not specified, all backup types will be 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 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 configuration file, which contains the values for the Tivoli Storage FlashCopy Manager configurable options. See "Set command" on page 194 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 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 set in the Tivoli Storage FlashCopy Manager for SQL 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 may 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.

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 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 activity logging 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 using multiple simultaneous instances of Tivoli Storage FlashCopy Manager for SQL to perform operations, use the **/logfile** parameter to specify a different log file for each instance used. This 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager for SQL GUI or the **set** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

If you specify **no**, the log file is not pruned during this command.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager for SQL command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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 inactivated. 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 inactivate. The object name uniquely identifies each backup object and is created by Tivoli Storage FlashCopy Manager. Use **query** to view the names of

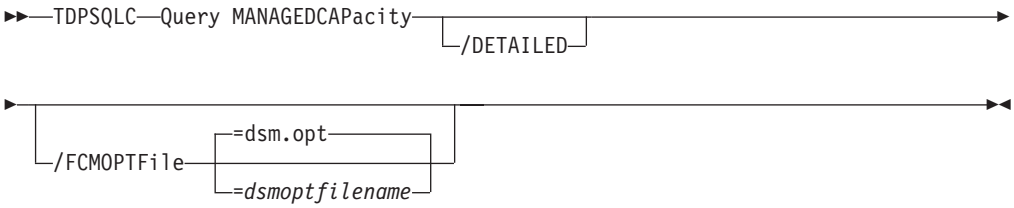
backup objects. You can use * as a wildcard character in *objectname* to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all backup objects of the specified SQL databases and backup object type.

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 represented in local inventory managed by Tivoli Storage FlashCopy Manager. This command is valid for all Windows platforms supported by Tivoli Storage FlashCopy Manager.



Parameters

/DETAILED
Results in a detailed listing of snapped volumes. If this option is not specified then only the total capacity is displayed.

/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***.

SQL Server 2005 example

Query the total managed capacity of SQL Server 2005 data represented in the local inventory with a detailed listing of snapped volumes. In this example there is a total of 1.25 TB of managed capacity. The detailed output shows that there are two snapshots of volumeid_1 and one snapshot of volumeid_2. Each unique volume is only counted once so the total adds up to 1.25 TB.

Command: `tdpsqlc query managedcapacity /detailed`

```
Managed Capacity: 1.25 TB

Volume: volumeid_1
Snapshot: snapshotid_1
Managed Capacity: 0.50 TB
Volume: volumeid_2
Snapshot: snapshotid_1
Managed Capacity: 0.75 TB

Volume: volumeid_1
Snapshot: snapshotid_2
Managed Capacity: 0.50 TB
```

SQL Server 2008 example

Query the total managed capacity of SQL Server 2008 data 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.

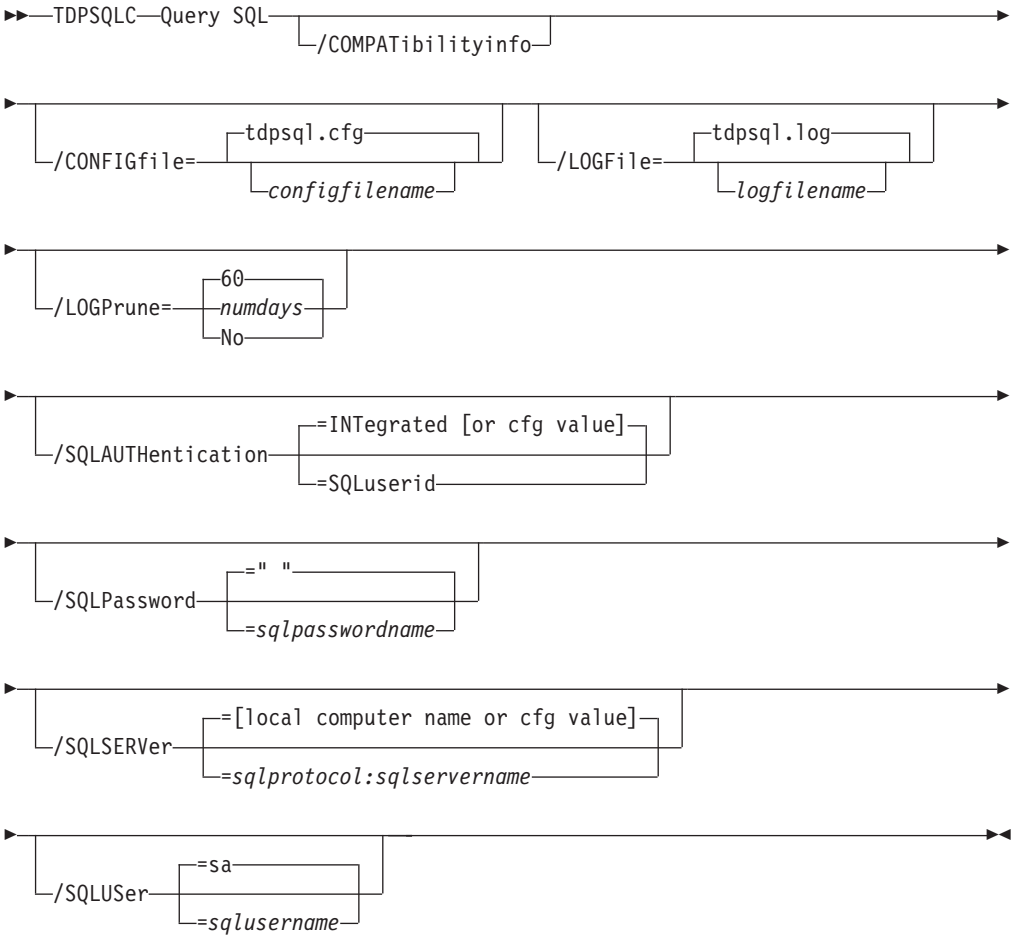
Use the **query sql** command to return the following information:

- SQL server information:
  - SQL server name and version
  - Database name
  - Database data space allocated
  - Database space used
  - Database log space allocated
  - Database log space used
  - Database options set (SELECT INTO / BULK COPY, TRUNCATE LOG ON CHECKPOINT, etc.)
- 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.



Query SQL positional parameters

Positional parameters immediately follow the **query** command and precede the optional parameters.

Specify one of the following when issuing a Tivoli Storage FlashCopy Manager for SQL **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 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 configuration information is listed to help determine if a backup object is correct for a SQL server, or to help in problem determination.

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 may be different, although the interpretation of individual character values may result in different characters being displayed or printed.

/CONFIGfile=*configfilename*

Use the **/configfile** parameter to specify the name (*configfilename*) of the Tivoli Storage FlashCopy Manager for SQL 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 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 195 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. 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 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 using multiple simultaneous instances of Tivoli Storage FlashCopy Manager for SQL to perform operations, use the **/logfile** parameter to specify a different log file for each instance used. This 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager for SQL GUI or the **set** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager for SQL command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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 used when logging 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 will use to log on to the SQL server. This 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 will 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. 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 specified by the SQL server configurable option in the Tivoli Storage FlashCopy Manager configuration file. This 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 are a period or the word *local* within parentheses.
- If the SQL server is a member of a fail-over cluster, the CLUSTERNODE option in the Tivoli Storage FlashCopy Manager options file must have the value YES.
- You must specify the name if the SQL server is not the default instance or is a member of a fail-over 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 reside on. The TCP/IP host name may not always be the same.

instancename
The name given to the named instance of SQL Server specified during installation of the instance.

virtualservername
The name given to the clustered SQL Server specified during clustering service setup. This 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 using 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:

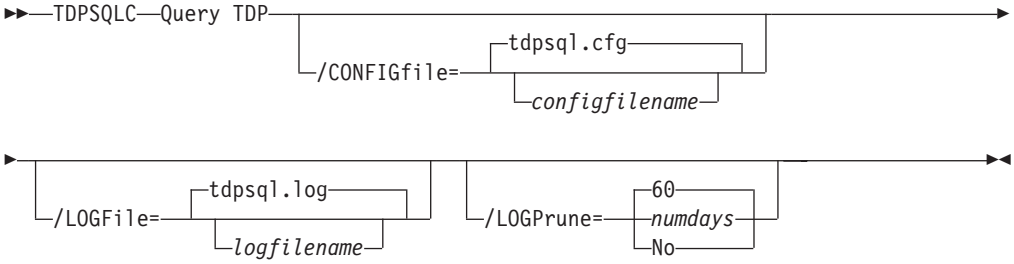
```
Connecting to SQL Server, please wait...

SQL Server Information
----------------------

SQL Server Name   ........................ POOH
SQL Server Version ...................... 10.0.1600 (SQL Server 2008)


Volume Shadow Copy Service (VSS) Information
--------------------------------------------

Writer Name            : SqlServerWriter
Local DSMAgent Node    : POOH
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.

Query TDP syntax

Use the **query TDP** command syntax diagrams as a reference to view available options and truncation requirements.



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 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 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 195 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.

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 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 using multiple simultaneous instances of Tivoli Storage FlashCopy Manager for SQL to perform operations, use the **/logfile** parameter to specify a different log file for each instance used. This 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager for SQL GUI or the **set** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager for SQL command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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 using the **query TDP** command.

In this example, the **tdpsqlc query tdp** command queried a list of the current values 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 managed by Tivoli Storage FlashCopy Manager to a SQL server.

Considerations:

- Make sure to review "VSS command-line considerations" before attempting any type of VSS Restore operation.
- 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 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.

VSS command-line considerations

Be aware of the following considerations when performing VSS restores.

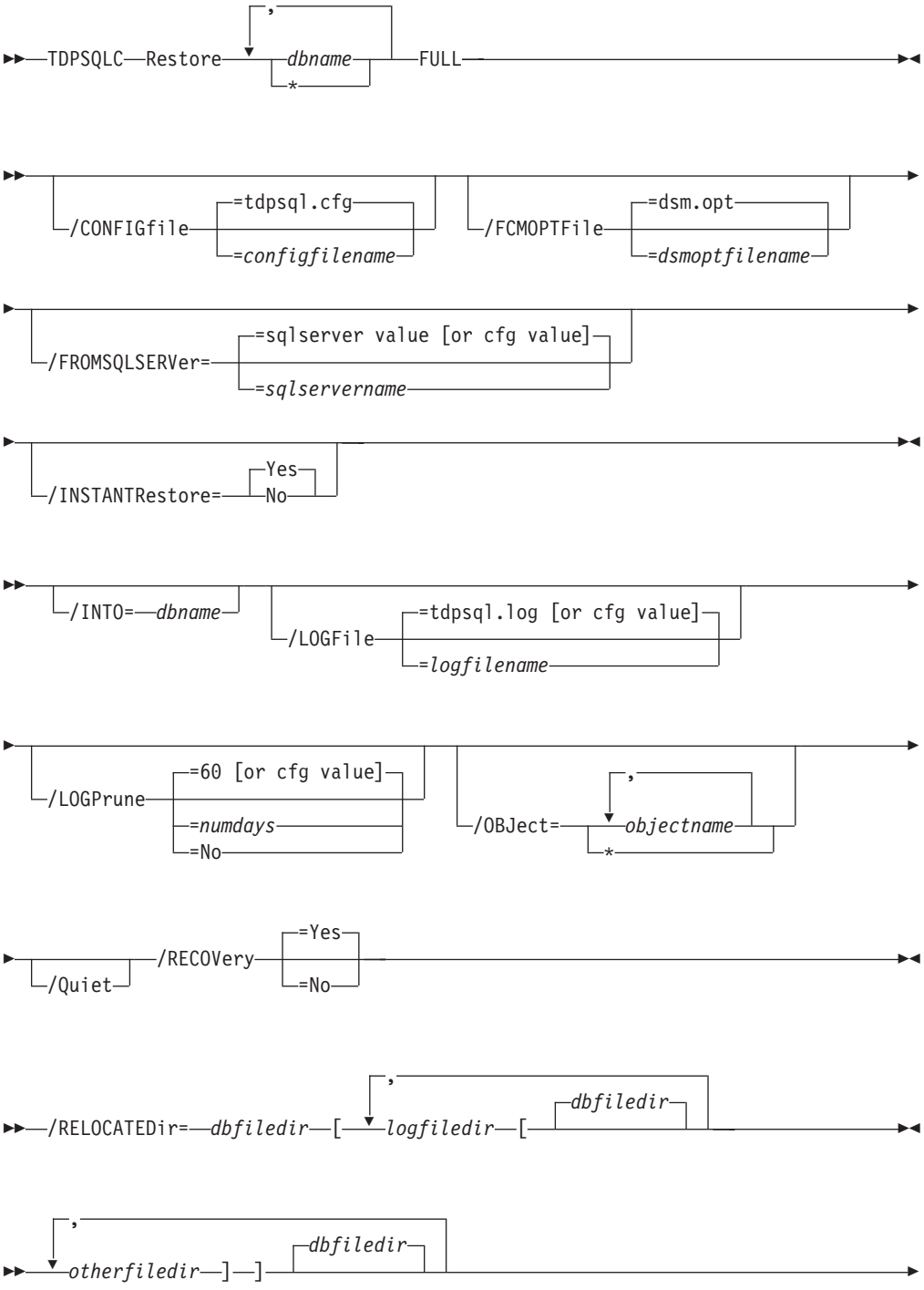
- Parallel VSS Fast Restore or VSS Instant Restore operations are not supported on Microsoft Windows Server 2003 and later.
- A VSS Instant Restore overwrites the entire contents of the source volumes. However, you can avoid overwriting the source volumes by specifying **/instantrestore**=*no*. This parameter setting bypasses volume-level copy and uses file-level copy instead to restore the files from a VSS Backup that resides on local shadow volumes. It is recommended that the source volume contain only the SQL database.
- Be aware that when a VSS Instant Restore from local shadow volumes is performed, the files and bytes transferred will display "0". When a VSS Fast Restore is performed, the files and bytes transferred will display the actual number of files and their size.

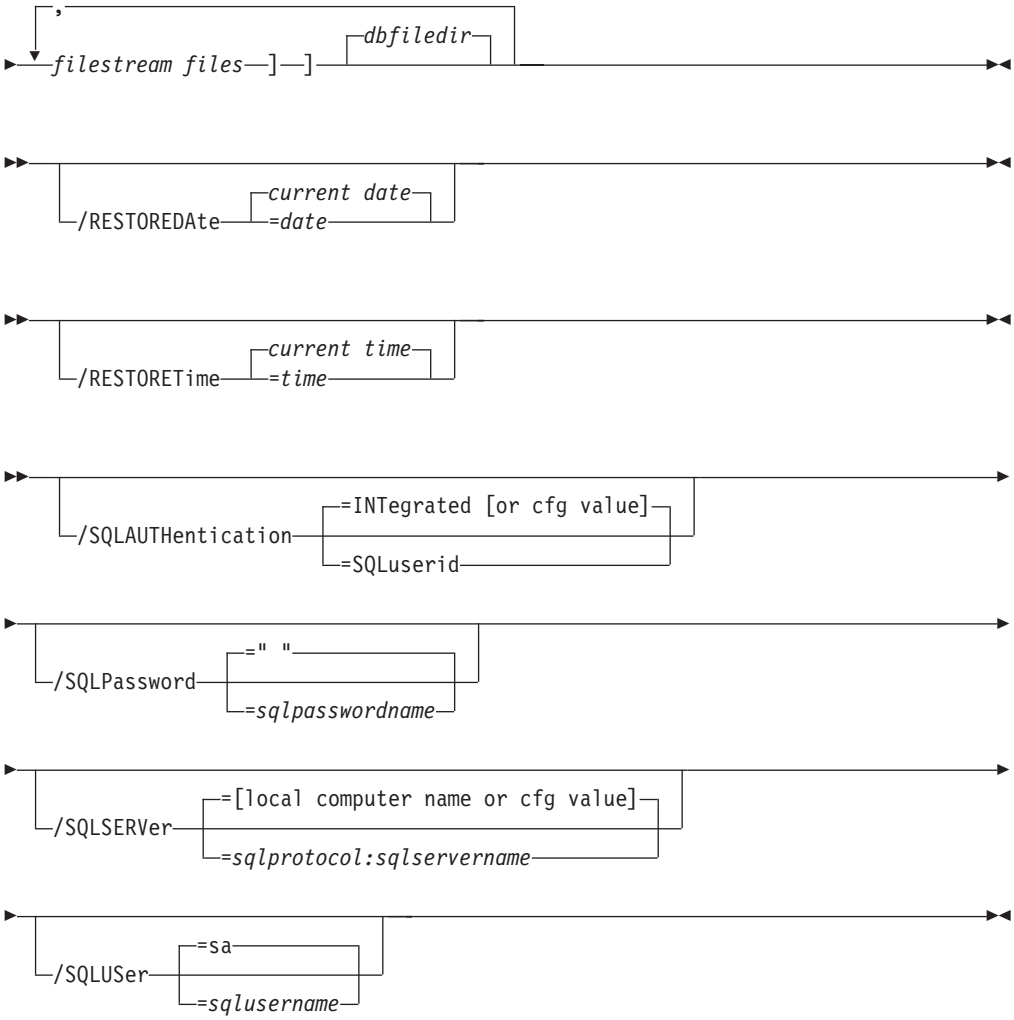
- When performing VSS Instant Restores on DS8000, SAN Volume Controller, or Storwize V7000, background copies that involve the volumes being restored are completed prior to initiating the VSS Instant Restore.
- Cross-SQL server restores are not supported by Microsoft.

Restore syntax

Use the **restore** command syntax diagrams as a reference to view available options and truncation requirements.

Syntax





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 you specify.

Restore optional parameters

Optional parameters follow 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 194 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 quotes.

- 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 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.

/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 resides on local shadow volumes. Note that an IBM Systems Storage SAN Volume Controller, DS8000, the XIV system, or 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 that resides on local shadow volumes if the backup exists on volumes that support it. This is the default.

No Use file-level copy to restore the files from a VSS Backup that resides on local shadow volumes. Note that bypassing volume-level copy means that SQL database files and log files are the only data overwritten on the source volumes.

When performing VSS Instant Restores on DS8000, Storwize V7000, or SAN Volume Controller 4.2.x or 4.3.x, you must ensure that any previous background copies (that involve the volumes being restored) are completed before initiating the VSS Instant Restore.

For guidelines on restoring into a an Exchange Server 2007 CCR or an Exchange Server 2010 DAG environment, see "VSS Instant Restore in a Cluster Continuous Replication environment" on page 76, "Restoring a Cluster Continuous Replication database copy backup on Exchange Server

2007" on page 77, and "Restoring a Database Availability Group database copy backup on Exchange Server 2010" on page 78

/INTO=*dbname*

For **restore** operations, **/into** specifies the SQL server database that you want a backup object 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 (*) may not appear in either the command *dbname* variable or the **/into** *dbname* variable.
- There must be exactly one item in the **/into** *dbname* variable list as well as in the command *dbname* list.
- Make sure to use the **/relocatedir** parameter when specifying **/into** *dbname*.

/LOGFile=*logfilename*

The **/logfile** parameter specifies the name of the activity log that is generated by Tivoli Storage FlashCopy Manager. This actvity log records significant events such as completed commands and error messages. The Tivoli Storage FlashCopy Manager actvity 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 activity logging off. If you do not specify **/logfile**, log records are written to the default log file. The default log file is ***tdpsql.log***.
- When using multiple simultaneous instances of Tivoli Storage FlashCopy Manager to perform operations, use the **/logfile** parameter to specify a different log file for each instance used. This 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**

The **/logprune** parameter prunes the Tivoli Storage FlashCopy Manager activity log and specifies how many days of entries are saved. By default, log pruning is enabled and performed once each day Tivoli Storage FlashCopy Manager is executed; however, this option allows you to disable log pruning or explicitly request a prune of the log for one command run even if the log file has already been pruned for the day. The *numdays* variable represents the number of days to save log entries. By default, 60 days of log entries are saved in the prune process.

Considerations:

- If you specify *numdays*, it can range from 0 to 9999. A value of 0 deletes all entries in the Tivoli Storage FlashCopy Manager activity log file except for the current command entries.
- If you specify **no**, the log file is not pruned during this command.

- If you do not specify **/logprune**, the default value is that specified by the logprune configurable option in the Tivoli Storage FlashCopy Manager configuration file. This is initially 60.
- If you specify **/logprune**, its value is used instead of the value stored in the Tivoli Storage FlashCopy Manager 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 60 is used.
- Changes to the value of the **timeformat** or **dateformat** parameter can result in an undesired pruning of the &agentname; log file. If you are running a command that may prune the log file and the value of the **timeformat** or **dateformat** parameter has changed, perform one of the following to prevent undesired 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. 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 inactivate. 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.

/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 or not you want to make additional restores 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)
Whenever you make a sequence of restores to a SQL database and the current restore is the final restore in the sequence, or is the only restore to a SQL database. This informs the SQL server the restore is complete and ready for uncompleted 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.

Considerations:

- Not specifying this option automatically rolls back incompleted transactions for the database.

Note:

1. Tivoli Storage FlashCopy Manager sorts the restore objects by database name, and, within database name, by backup time stamp from earliest to latest. A **query FCM** command will also display 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 (SQL Server 2005). FILESTREAM files are included for SQL Server 2008 and SQL Server 2008 R2.

The *dbfiledir* variable specifies the directory location of the SQL database you want to relocate. Note that if the *logfiledir* and/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. Note that 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 and SQL Server 2008 R2) you want to relocate. Note that if the *filestream files* variable is not specified, the SQL Server FILESTREAM data files are restored to the directory specified by *dbfiledir*. This 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 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 only be specified when restoring 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 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 only be specified when restoring 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 used when logging 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 will use to log on to the SQL server. This 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 will 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 (" ").

Note: 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 is the SQL server 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 specified by the SQL server configurable option in the Tivoli Storage FlashCopy Manager configuration file. This 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 are a period or the word *local* within parentheses.
- If the SQL server is a member of a fail-over cluster, the CLUSTERNODE option must have the value YES.
- You must specify the name if the SQL server is not the default instance or is a member of a fail-over 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

Format	Instance?	Clustered?	Name required?
virtualservername\ *instancename*	named	yes	yes

localcomputername
The network computer name of the computer the SQL server and Tivoli Storage FlashCopy Manager reside on. The TCP/IP host name may not always be the same.

instancename
The name given to the named instance of SQL Server specified during installation of the instance.

virtualservername
The name given to the clustered SQL Server specified during clustering service setup. This 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**.

Note: This parameter is ignored if you use the **/sqlauth=integrated** parameter with it.

Restore output examples

These output examples provide a sample of the text, messages, and process status that displays when using 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 6, Release 3, Level 0.0
(C) Copyright IBM Corporation 1997, 2011. 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

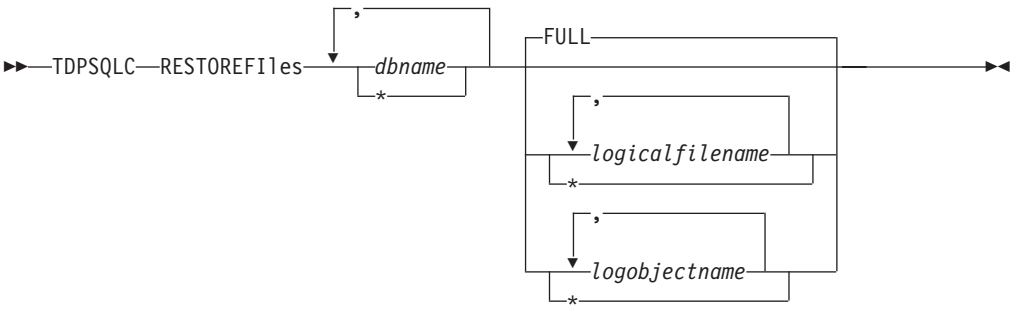
Use the **restorefiles** command to restore VSS-based backups on theTivoli Storage Manager (/BACKUPDESTINATION=TSM), or stored locally (/BACKUPDESTINATION=LOCAL).

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 machine 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 located on the Tivoli Storage FlashCopy Manager (/BACKUPDESTINATION=TSM) can be restored by using **restorefiles** on the same machine that performed the VSS-based backup, or by running the command on a machine that has the Tivoli Storage FlashCopy Manager client installed and configured.
- The directory specified in the **restorefiles** command has the VSS component name appended so that multiple databases can be restored to the same target directory.
- VSS-based backups that are stored on the local machine by using a persistent snapshot (/BACKUPDESTINATION=LOCAL), can be restored only by running the **restorefiles** command on the same machine that performed 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 machine that generated the snapshot. Or for VSS, you can run a **restorefiles** command from any of the machines in the cluster.

Restorefiles syntax

Use the **restorefiles** command syntax diagram as a reference for available options and truncation requirements.



Related reference

"Restorefiles optional parameters"

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 parameters specify the type of backup from which the files are restored:

FULL

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 located on the TSM Server are restored using the **restorefiles** command with **/BACKUPDESTINATION=TSM**. VSS backups that are running on a local machine using a persistent snapshot are restored 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 theTivoli Storage FlashCopy Manager configuration file that contains the values for theTivoli Storage FlashCopy Manager configuration options.

The *configfilename* variable can include a fully qualified path. If the *configfilename* variable does not include a path, theTivoli 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 performed. The default is the local SQL Server name.

/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 using multiple simultaneous instances ofTivoli Storage FlashCopy Manager to perform operations, use the **/logfile** parameter to specify a different log file for each instance used. This 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use theTivoli Storage FlashCopy Manager GUI or the **set** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing aTivoli Storage FlashCopy Manager command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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 whetherTivoli Storage FlashCopy Manager should wait for removable media to mount (such as tapes or CDs) or to stop the current operation. This situation occurs when theTivoli Storage FlashCopy Manager is configured to store backup data on removable media and waits for a required storage volume to be mounted.

You can specify:

Yes Wait for tape mounts. This 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 does not affect the level of information 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 includes databases, logs, and SQL Server full-text index files (SQL Server 2005).

The *dbfiledir* variable specifies the directory location of the SQL database you want to relocate. Note that 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. Note that 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 **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 will be 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 thatTivoli 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 whereTivoli 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 theTivoli Storage FlashCopy Manager options file (dsm.opt), you do not need to supply the password 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 Managerconnects 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 has not yet been 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 using 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:

```
e:\test\Finance\finance.mdf
e:\test\Finance\finance_log.ldf
```

Set command

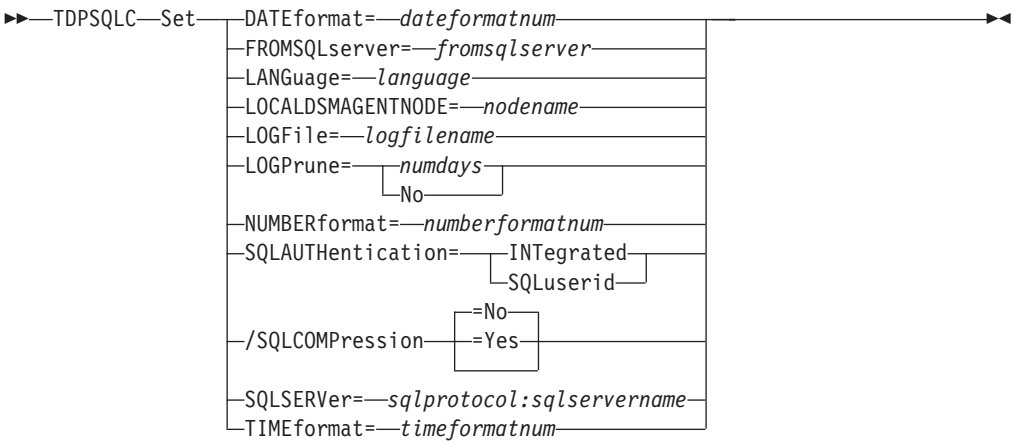
Use the **set** command to set the Tivoli Storage FlashCopy Manager for SQL configuration parameters defined in the Tivoli Storage FlashCopy Manager for SQL configuration file, ***tdpsql.cfg*** by default.

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 in the GUI **Edit** menu bar item.

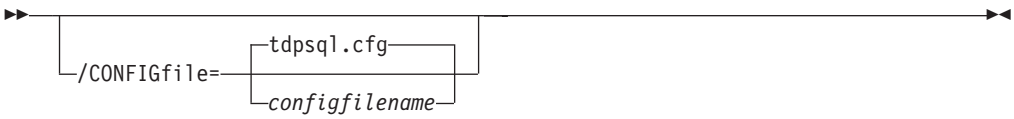
Note: If a configuration file is not specified, the tdpsql.cfg values are used, and a default configuration file is created with just the ***lastprunedate*** value. If an invalid or non-existent file is specified, the default values are used.

Set syntax

Use the **set** command syntax diagrams as a reference to view available options and truncation requirements.



Set Optional Parameters:



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 issuing a **set** command.

DATEformat=*dateformatnum*

The ***/dateformat*** parameter selects the format you want to use to display dates.

The *dateformatnum* variable can range from 1 to 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 performing one of the following:

- After changing the value of the **dateformat** parameter, make a copy of the existing log file before running 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 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 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 machine that performs the VSS backups. This positional parameter must be specified for VSS operations to be performed.

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 activity logging 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**

The **logprune** parameter prunes the Tivoli Storage FlashCopy Manager activity log and specifies how many days of entries to save. By default, log pruning is enabled and performed once each day Tivoli Storage FlashCopy Manager is executed; however, this option allows you to disable log pruning. The *numdays* variable represents the number of days to save log entries.

Considerations:

- If you specify *numdays*, it can range from 0 to 9999. The initial value is 60. A value of 0 deletes all entries in the Tivoli Storage FlashCopy Manager activity log file except for the current command entries.
- If you specify **no**, the log file is not pruned.

NUMBERformat=*numberformatnum*

The **numberformat** parameter specifies the format of the numbers displayed by Tivoli Storage FlashCopy Manager. The *numberformatnum* variable can range from 1 to 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 used when logging 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 will use to log on to the SQL server. This 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 will use to log on to the SQL server. That user id must have the SQL Server SYSADMIN fixed server role.

SQLSERVer=*sqlprotocol:sqlservername*

The **sqlserver** parameter specifies the SQL server that Tivoli Storage FlashCopy Manager logs on to. This is the SQL server 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 displayed by Tivoli Storage FlashCopy Manager. The *timeformatnum* variable can range from 1 to 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 performing one of the following:

- After changing the value of the **timeformat** parameter, make a copy of the existing log file before running Tivoli Storage FlashCopy Manager.
- Specify a new log file with the **/logfile** parameter.

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 quotes.
- 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.

/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 running SQL Server 2008 or later. For SQL Server 2008, backup compression is only supported on Enterprise Edition. SQL Server 2008 R2, backup compression is supported on Standard, Enterprise, and Datacenter editions.

Set output examples

These output examples provide a sample of the text, messages, and process status that displays when using 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.
```

Command-line reference: Tivoli Storage FlashCopy Manager for custom application and file system

The name of the Tivoli Storage FlashCopy Manager for custom application and file system command-line interface is **fcmcli.exe**. By default, this program is located in the Tivoli Storage FlashCopy Manager installation directory (`C:\Program Files\Tivoli\FlashCopyManager\`).

Launching the Tivoli Storage FlashCopy Manager command-line interface

Follow these steps to launch the Tivoli Storage FlashCopy Manager command-line interface for custom application and file system:

1. Start the Tivoli Storage FlashCopy Manager graphical user interface (GUI).
2. Expand the **Protect and Recover Data** node.
3. In the tree view, select a File System node.
4. Select the **Automate** tab on the center display, an integrated command line is available in the bottom of the task window for inputting commands. The top section of the window displays the command output.

Command-line interface help

Issue the `fcmcli ?` or `fcmcli help` command to display help for the command-line interface.

Command-line parameter characteristics

Review these parameter characteristics before attempting a command-line operation.

- Positional parameters do not include a leading slash (/) or dash (-)
- Optional parameters can appear in any order after the required parameters
- Optional parameters begin with a forward slash (/) or a dash (-)
- Minimum abbreviations for keywords are indicated in upper case 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 appear only once per command invocation

For help in reading syntax diagrams, refer to “Reading syntax diagrams” on page xvi.

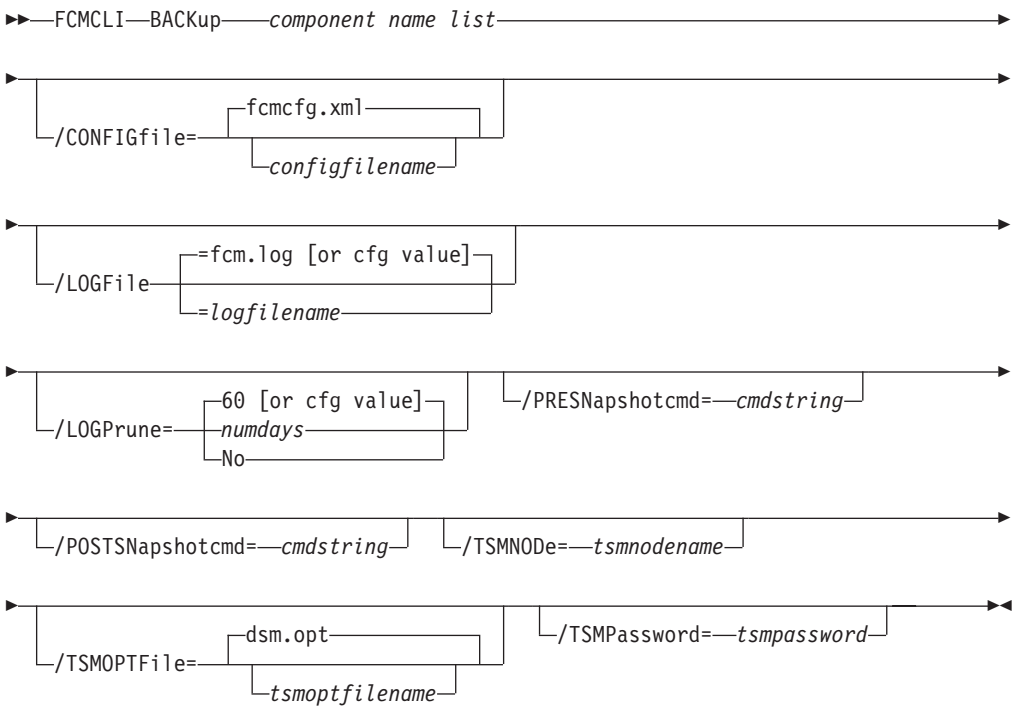
Backup command

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.



Backup positional parameter

The positional parameter immediately follow 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, separated by commas, to backup.

Backup optional parameters

Optional parameters follow the **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 **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 240 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. 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager GUI or the **update config** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- Make a copy of the existing log file.
- Specify a new log file with the **/logfile** parameter or **logfile** setting.

/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 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 has been created. This parameter is used in conjunction with the **/presnapshotcmd** parameter. The *cmdstring* variable must be a fully qualified path.

/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), you do not need to supply the password 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 has not yet been 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 using 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:

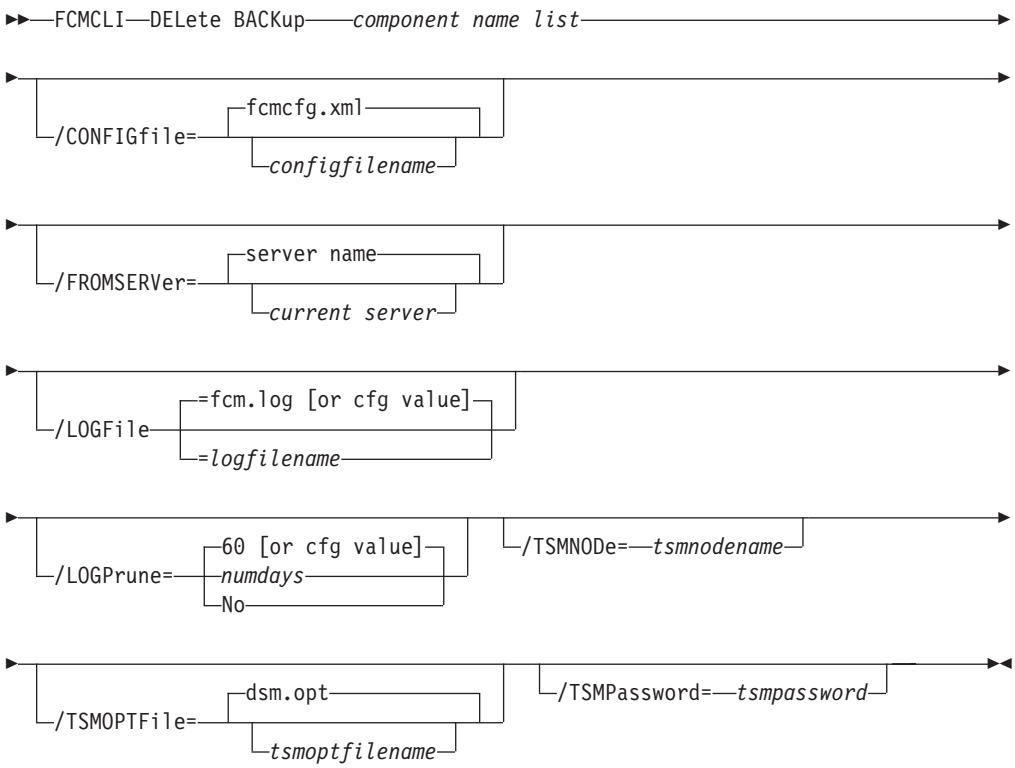
```
C:\Program Files\Tivoli\FlashCopyManager>fcmcli back c:,d:
/presn="C:\Program Files\Tivoli\FlashCopyManager\stopdb.cmd"
/postsn="C:\Program Files\Tivoli\FlashCopyManager\startdb.cmd"

FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 3, Release 1, Level 0.0
(C) Copyright IBM Corporation 2009, 2011. 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.



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 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"
```

See "Update Config positional parameters" on page 240 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 performed. 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is

enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager GUI or the **update config** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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), you do not need to supply the password 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 has not yet been 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 using 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:
  <First Storage Group : VSS : full : 03/12/2011 12:04:33>
VSS Delete backup operation completed with rc = 0
   Files Examined   : 2
   Files Completed  : 2
   Files Failed     : 0
   Total Bytes      : 0
```

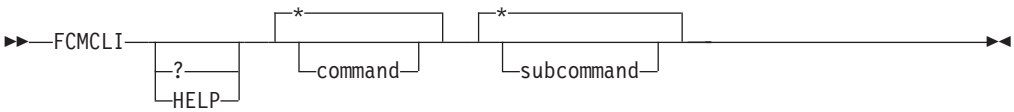
Help command

Use the **help** command to display help for Tivoli Storage FlashCopy Manager commands.

This command lists one or more commands and their parameters. When using a non-English language, you might need to set the width of your screen display to a value greater than 80 characters in order to view 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.



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.

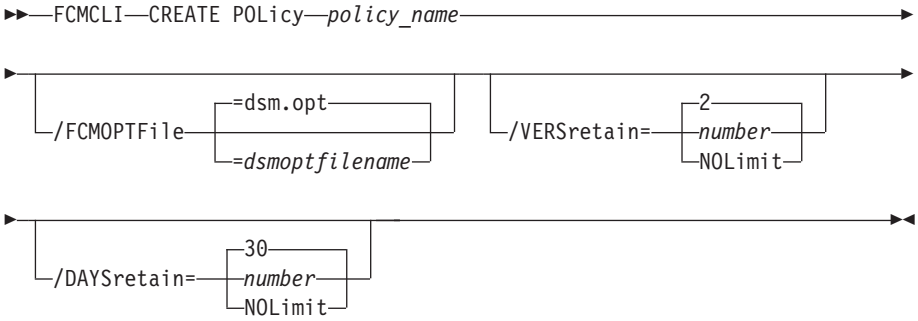
*|*subcommand*

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 new policy.

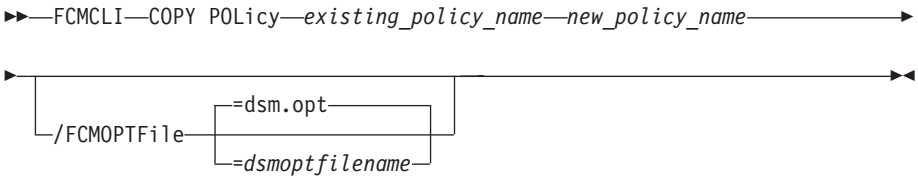


Parameters:

- **policy_name** (required): Specifies the name of the policy that is being created. In order 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.

Copy Policy

This command is used to copy an existing policy to a new policy.



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

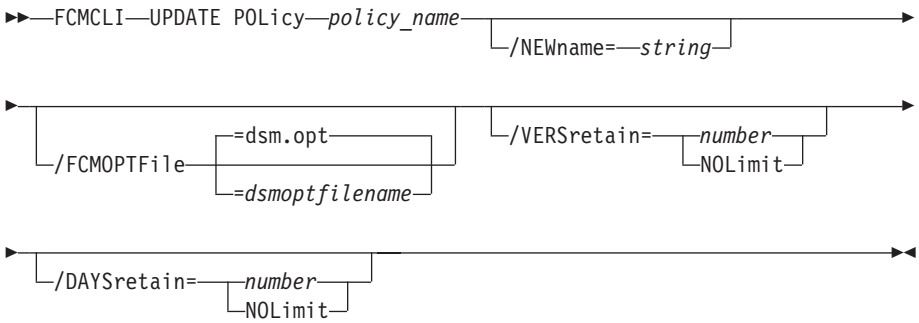
This command is used to list the attributes of a policy.

Parameters: * (required) Specifies all policies are to be queried. The results of the query will be displayed as follows:

```
                Connecting to Server, please wait...

Policy      Number of snapshots to keep    Days to keep a snapshot

--------    ---------------------------    ----------
FCMPOL                    4                60

STANDARD                  3                30
```

Update Policy

This command is used to update or modify an existing policy.

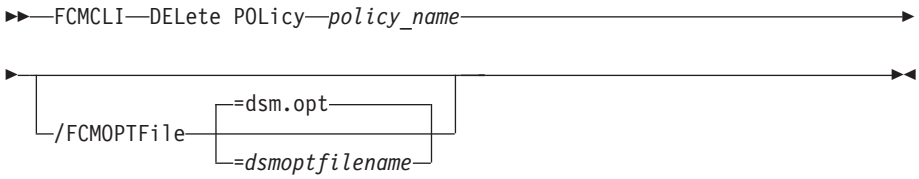


Parameters:

- **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.



Parameters

- **policy_name** (required): Specifies the name of the policy being deleted.

Tivoli Storage FlashCopy Manager Policy Examples

These output examples provide a sample of the text, messages, and process status that displays when using 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:

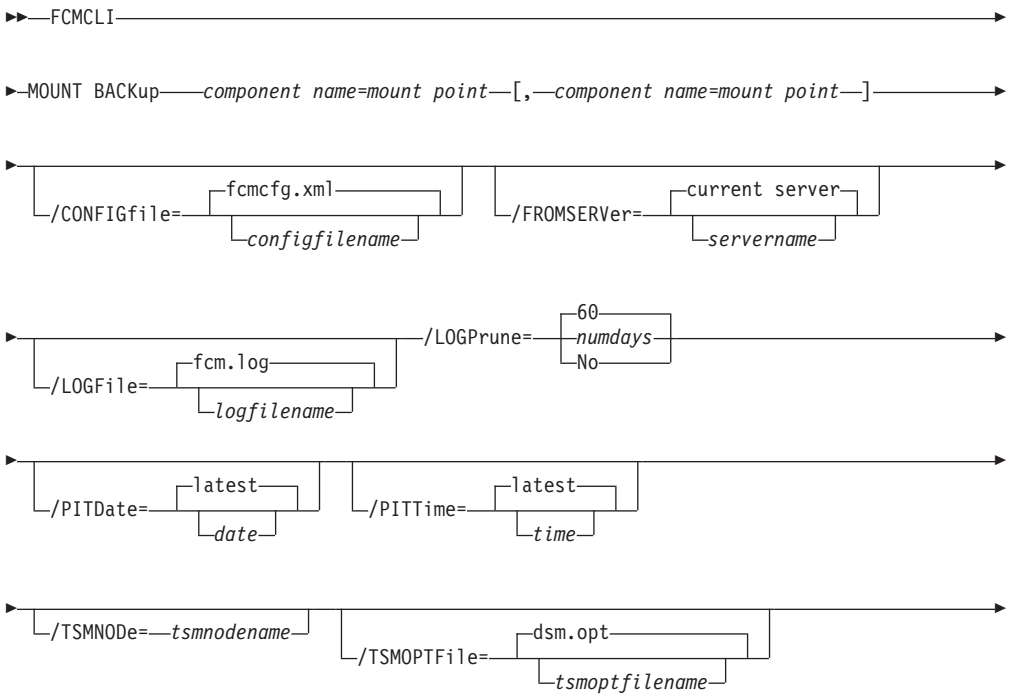
```
Policy 'FCMPOL1' was deleted.

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.



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 mount point of the original component.

mount point
Specify the volume or mount point in which to expose the component.

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 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 240 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 performed. 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager GUI or the **update config** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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 is 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 taken 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 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 establishes the *date* at the specified date.
- If you specify *time* without *date*, then *date* defaults to the current date. This 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 which 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 is 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 taken 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 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 establishes the *date* at the specified date.
- If you specify *time* without *date*, then *date* defaults to the current date. This establishes the mount 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), you do not need to supply the password 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 has not yet been 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 using 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 3, Release 1, Level 0.0
(C) Copyright IBM Corporation 2009, 2011. 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 : 10/04/2011 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=10/07/2011 /PITTIME=08:53:36` command mounts multiple volumes. The following output is displayed:

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 3, Release 1, Level 0.0
(C) Copyright IBM Corporation 2009, 2011. 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 : 10/07/2011 08:53:35>
<d:\mnt\mp2 = N: : VSS : full : 10/07/2011 08:53:36>
```

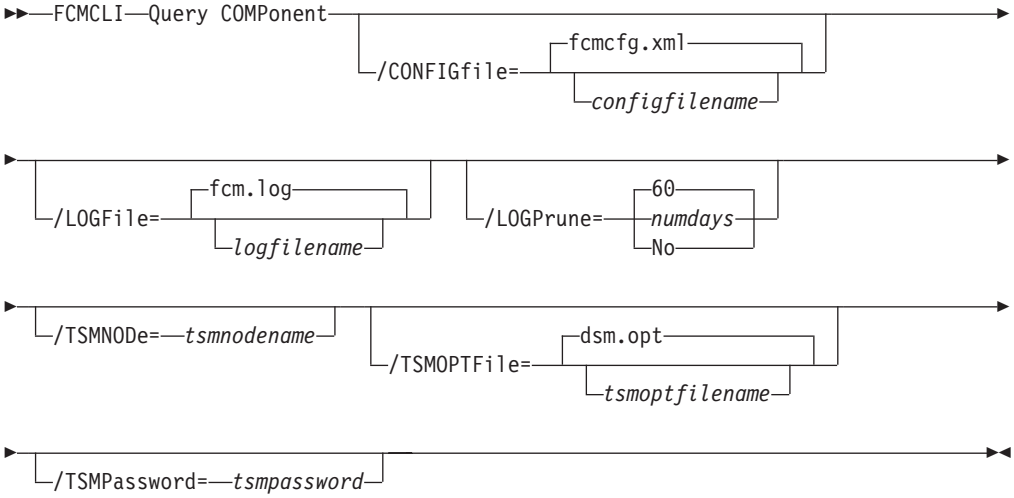
Query Component command

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.



Query Component optional parameters

Optional parameters follow the **query component** command.

/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 component** 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 240 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. 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager GUI or the **update config** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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), you do not need to supply the password 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 has not yet been 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 Example

This output example provides a sample of the text, messages, and process status that displays when using the **query component** command.

In this example, the **fcmcli query component /configfile=customconfig.xml** command queried the components associated with the customconfig.xml configuration file. The following output is displayed:

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 3, Release 1, Level 0.0
(C) Copyright IBM Corporation 2009, 2011. All rights reserved.

FMF5957I The C:\Program Files\Tivoli\flashcopymanager\fcm.log log
file was pruned successfully.

Querying components, please wait...

Connecting to FCM Server as node 'JUNE_FS'...
Connecting to Local DSM Agent 'JUNE'...
Querying VSS Information, please wait...

Volume/Mount Points
===============================================================================

Volume/Mount Point  : C:
Volume Size         :   136.60GB
Volume Occupancy    :    24.47GB
Volume GUID         : 07352a9e-37c0-11dd-b1a9-806e6f6e6963
Server              : JUNE

Volume/Mount Point  : D:
Volume Size         :    50.01GB
Volume Occupancy    :    15.34GB
Volume GUID         : cf812f8c-3823-11dd-8e81-00151736a23c
Server              : JUNE

Volume/Mount Point  : E:
Volume Size         :    83.67GB
Volume Occupancy    :   530.81MB
Volume GUID         : aa3683ac-4bdc-11de-b146-001a6499a400
Server              : JUNE

Volume/Mount Point  : F:
Volume Size         : 1,498.25MB
Volume Occupancy    :    10.13MB
Volume GUID         : aa3683af-4bdc-11de-b146-001a6499a400
Server              : JUNE

Volume/Mount Point  : G:
Volume Size         : 1,529.59MB
Volume Occupancy    :    25.62MB
Volume GUID         : e28e95f6-6d8b-11df-b5f7-001a6499a400
Server              : JUNE

Volume/Mount Point  : H:
Volume Size         : 1,529.59MB
Volume Occupancy    :    32.45MB
Volume GUID         : e28e95f9-6d8b-11df-b5f7-001a6499a400
Server              : JUNE

Volume/Mount Point  : I:
Volume Size         : 3,067.06MB
Volume Occupancy    :    30.47MB
Volume GUID         : e28e95fc-6d8b-11df-b5f7-001a6499a400
Server              : JUNE

Volume/Mount Point  : J:
Volume Size         : 3,067.06MB
Volume Occupancy    :    53.33MB
Volume GUID         : e28e95ff-6d8b-11df-b5f7-001a6499a400
Server              : JUNE

Volume/Mount Point  : O:
Volume Size         : 1,498.25MB
Volume Occupancy    :    10.12MB
Volume GUID         : aa3683b2-4bdc-11de-b146-001a6499a400
Server              : JUNE
```

In this example, the **fcmcli query component** command queried the components for a list of the volume and mount points that are available for backup. The following output is displayed:

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 3, Release 1, Level 0.0
(C) Copyright IBM Corporation 2009, 2011. All rights reserved.

Querying components, please wait...

Connecting to FCM Server as node 'JUNE_FS'...
Connecting to Local DSM Agent 'JUNE'...
Querying VSS Information, please wait...

Volume/Mount Points
===========================================================================

Volume/Mount Point  : C:
Volume Size         :   136.60GB
Volume Occupancy    :    24.47GB
Volume GUID         : 07352a9e-37c0-11dd-b1a9-806e6f6e6963
Server              : JUNE

Volume/Mount Point  : D:
Volume Size         :    50.01GB
Volume Occupancy    :    15.34GB
Volume GUID         : cf812f8c-3823-11dd-8e81-00151736a23c
Server              : JUNE

Volume/Mount Point  : E:
Volume Size         :    83.67GB
Volume Occupancy    :   530.81MB
Volume GUID         : aa3683ac-4bdc-11de-b146-001a6499a400
Server              : JUNE

Volume/Mount Point  : F:
Volume Size         : 1,498.25MB
Volume Occupancy    :    10.13MB
Volume GUID         : aa3683af-4bdc-11de-b146-001a6499a400
Server              : JUNE

Volume/Mount Point  : G:
Volume Size         : 1,529.59MB
Volume Occupancy    :    25.62MB
Volume GUID         : e28e95f6-6d8b-11df-b5f7-001a6499a400
Server              : JUNE

Volume/Mount Point  : H:
Volume Size         : 1,529.59MB
Volume Occupancy    :    32.45MB
Volume GUID         : e28e95f9-6d8b-11df-b5f7-001a6499a400
Server              : JUNE

Volume/Mount Point  : I:
Volume Size         : 3,067.06MB
Volume Occupancy    :    30.47MB
Volume GUID         : e28e95fc-6d8b-11df-b5f7-001a6499a400
Server              : JUNE

Volume/Mount Point  : J:
Volume Size         : 3,067.06MB
Volume Occupancy    :    53.33MB
Volume GUID         : e28e95ff-6d8b-11df-b5f7-001a6499a400
Server              : JUNE

Volume/Mount Point  : O:
Volume Size         : 1,498.25MB
Volume Occupancy    :    10.12MB
Volume GUID         : aa3683b2-4bdc-11de-b146-001a6499a400
Server              : JUNE
```

Query Config command

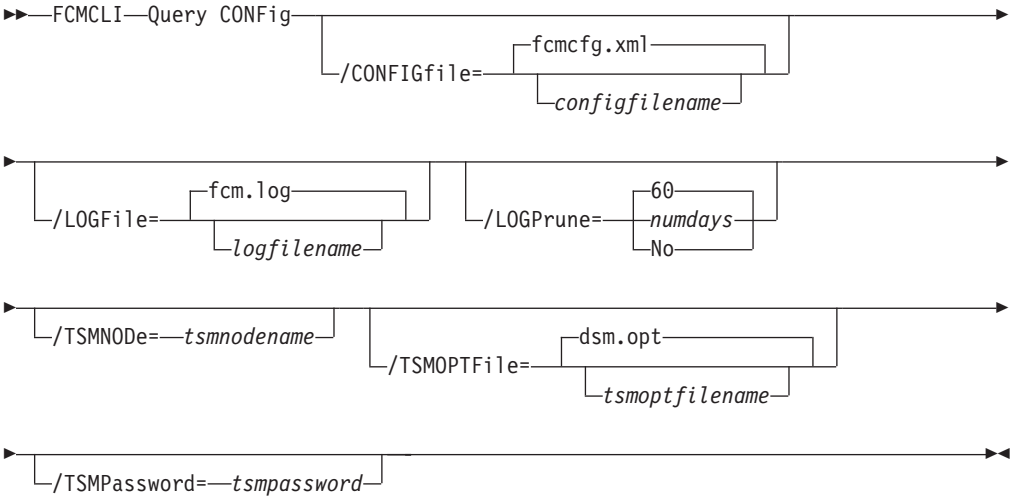
Use the **query config** command to display Tivoli Storage FlashCopy Manager configuration information.

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.



Query Config optional parameters

Optional parameters follow the **query config** command.

/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 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"
```

See "Update Config positional parameters" on page 240 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. 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager GUI or the **update config** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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), you do not need to supply the password 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 has not yet been 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 Config Example

This output example provides a sample of the text, messages, and process status that displays when using the **query config** command.

The **fcmcli query config** command displays information about Tivoli Storage FlashCopy Manager. An example of the output is displayed below.

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 3, Release 1, Level 0.0
(C) Copyright IBM Corporation 2009, 2011. All rights reserved.

FlashCopy Manager Server Connection Information
--------------------------------------------------

Nodename ........................... JUNE_FS
NetWork Host Name of Server ........ FLASHCOPYMANAGER
TSM API Version .................... Version 6, Release 3, Level 0.0
TSM API Configuration File ......... C:\Program Files\Tivoli\flashcopymanager\dsm.opt

Server Name ........................ Virtual Server
Server Type ........................ Virtual Platform
Server Version ..................... Version 6, Release 3, Level 0.0
Default Management Class ........... STANDARD

FCM for Windows Preferences
--------------------------------------------------

CONFIGfile ......................... C:\Program Files\Tivoli\flashcopymanager\fcmcfg.xml
DATEformat ......................... 1
LANGuage ........................... ENU
LOCALDSMAgentnode .................. JUNE
LOGFile ............................ C:\Program Files\Tivoli\flashcopymanager\fcm.log
LOGPrune ........................... 60
NUMBERformat ....................... 1
POSTSNapshotcmd ..................
PRESNapshotcmd ...................
TIMEformat ......................... 1
```

The **fcmcli query config /logfile=fcm.log.xml /configfile=customconfig.xml** command displays information about Tivoli Storage FlashCopy Manager.... An example of the output is displayed below.

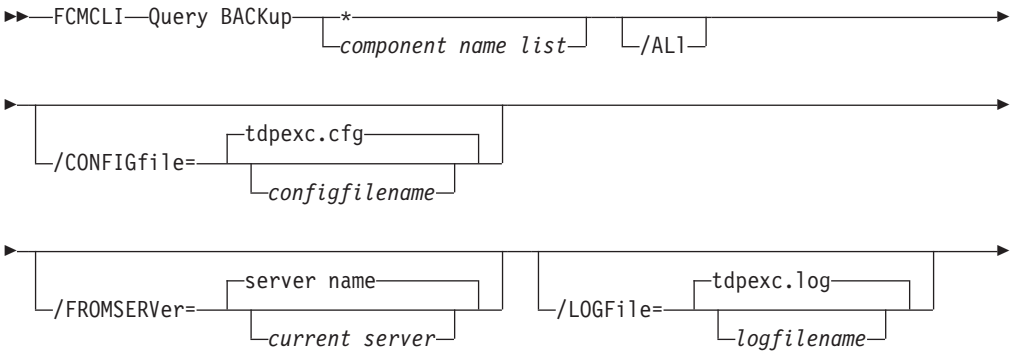
```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 3, Release 1, Level 0.0
(C) Copyright IBM Corporation 2009, 2011. All rights reserved.

FMF5956I The C:\Program Files\Tivoli\flashcopymanager\fcm.log.xml log file could
not be pruned. Processing will continue.
FlashCopy Manager Server Connection Information
--------------------------------------------------

Nodename ........................... JUNE_FS
NetWork Host Name of Server ....... FLASHCOPYMANAGER
TSM API Version ................... Version 6, Release 3, Level 0.15
TSM API Configuration File ........ C:\Program Files\Tivoli\flashcopymanager\dsm.opt

Server Name ....................... Virtual Server
Server Type ....................... Virtual Platform
Server Version .................... Version 6, Release 3, Level 0.15
Default Management Class .......... STANDARD

FCM for Windows Preferences
--------------------------------------------------

CONFIGfile ........................ customconfig.xml
DATEformat ........................ 1
LANGuage .......................... ENU
LOCALDSMAgentnode ................. JUNE
LOGFile ........................... C:\Program Files\Tivoli\flashcopymanager\fcm.log.xml
LOGPrune .......................... 60
NUMBERformat ...................... 1
POSTSNapshotcmd ...................
PRESNapshotcmd ....................
TIMEformat ........................ 1
```

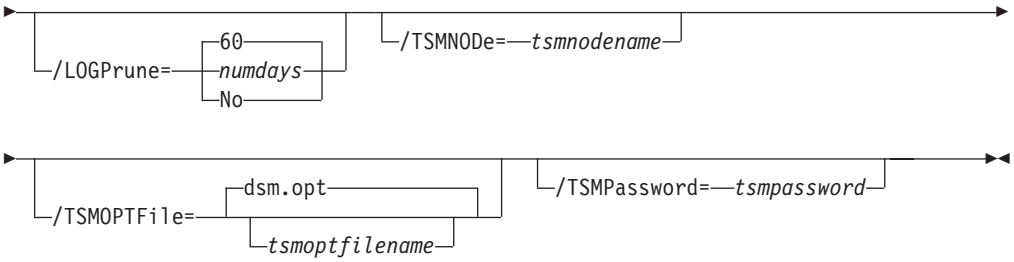
Query Backup command

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.





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 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"
```

See “Update Config positional parameters” on page 240 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 performed. 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager GUI or the **update config** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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.

Use the Tivoli Storage FlashCopy Manager **query backup * /all** command to view the names of all available backup objects.

The **/object** parameter is used to delete only one backup at a time. When multiple backups exist, the **/object** parameter must be specified with the **query backup** command. If it is not specified, the **query backup** command fails.

/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), you do not need to supply the password 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 has not yet been 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 using the **query backup** command.

The **fcmcli query backup * /all** command displays information about all active and inactive backups managed by Tivoli Storage FlashCopy Manager. An example of the output is displayed below.

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 3, Release 1, Level 0.0
(C) Copyright IBM Corporation 2009, 2011. 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           : 03/31/2011 07:35:11
Backup State               : Active
Management Class           : DEFAULT
Mounted as                 :
Object Name                : 20110331073511
Instant Restore Supported  : No

Volume/Mount Point         : F:
Volume GUID                : aa3683af-4bdc-11de-b146-001a6499a400
Server                     : JUNE
Volume Occupancy           :    10.13MB
Backup Date/Time           : 03/30/2011 13:50:44
Backup State               : Inactive
Management Class           : DEFAULT
Mounted as                 :
Object Name                : 20110330135044
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           : 03/31/2011 07:35:50
Backup State               : Active
Management Class           : DEFAULT
Mounted as                 :
Object Name                : 20110331073550
Instant Restore Supported  : No

Volume/Mount Point         : O:
Volume GUID                : aa3683b2-4bdc-11de-b146-001a6499a400
Server                     : JUNE
Volume Occupancy           :    10.12MB
Backup Date/Time           : 03/31/2011 07:24:44
Backup State               : Inactive
Management Class           : DEFAULT
Mounted as                 :
Object Name                : 20110331072444
Instant Restore Supported  : No
```

The **fcmcli query backup** command displays information about backups managed by Tivoli Storage FlashCopy Manager. An example of the output is displayed below.

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 3, Release 1, Level 0.0
(C) Copyright IBM Corporation 2009, 2011. 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           : 03/31/2011 07:35:11
Backup State               : Active
Management Class           : DEFAULT
Mounted as                 :
Object Name                : 20110331073511
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           : 03/31/2011 07:35:50
Backup State               : Active
Management Class           : DEFAULT
Mounted as                 :
Object Name                : 20110331073550
Instant Restore Supported  : No
```

The **fcmcli query backup** command displays information about backups managed by Tivoli Storage FlashCopy Manager. An example of the output is displayed below.

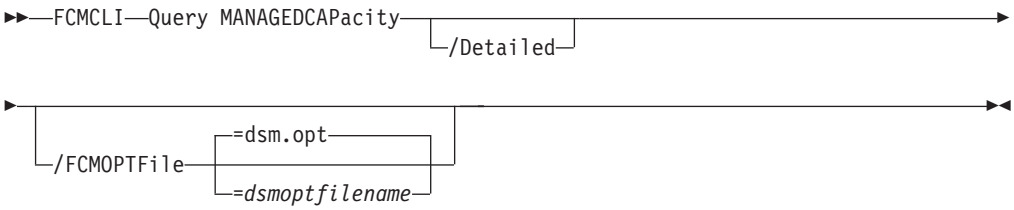
```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 3, Release 1, Level 0.0
(C) Copyright IBM Corporation 2009, 2011. All rights reserved.

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           : 03/31/2011 07:35:11
Backup State               : Active
Management Class           : DEFAULT
Mounted as                 :
Object Name                : 20110331073511
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           : 03/31/2011 07:35:50
Backup State               : Active
Management Class           : DEFAULT
Mounted as                 :
Object Name                : 20110331073550
Instant Restore Supported  : No
```

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 represented in local inventory managed by Tivoli Storage FlashCopy Manager. This command is valid for all Windows platforms supported by Tivoli Storage FlashCopy Manager.



Parameters

/Detailed
Results in a detailed listing of snapped volumes. If this option is not specified then only the total capacity is displayed.

/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***.

In this example, the **fcmcli query managedcapacity** command displays the total amount of managed capacity in use in the local inventory. The following output is displayed:

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 3, Release 1, Level 0.0
(C) Copyright IBM Corporation 2009, 2011. All rights reserved.

Preparing for a QUERY MANAGEDCAPACITY operation, please wait...


Total Managed Capacity : 2.93 GB (3,142,053,888 bytes)
```

In this example, the **fcmcli 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:

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 3, Release 1, Level 0.0
(C) Copyright IBM Corporation 2009, 2011. All rights reserved.

Preparing for a QUERY MANAGEDCAPACITY operation, please wait...

Total Managed Capacity : 31.99 GB (34,353,438,720 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)
Completed
```

Restore command

Use the **restore** command to restore a Tivoli Storage FlashCopy Manager backup.

You must have local registry rights to perform a Tivoli Storage FlashCopy Manager for Exchange restore.

VSS operations require special considerations that must be reviewed before attempting a VSS Restore. See these two sections for important guidelines:

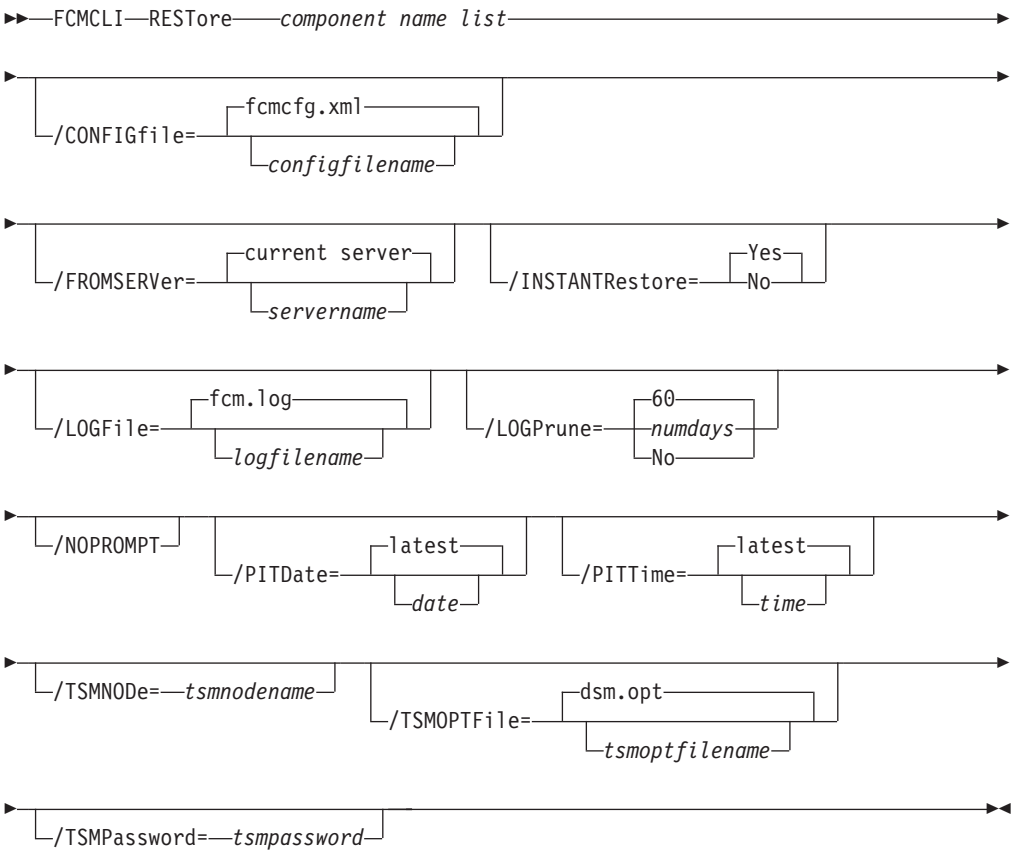
- "VSS considerations" on page 126
- "Restoring VSS Backups into other locations" on page 22

The GUI provides an easy-to-use, flexible interface to help you perform 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.



Restore positional parameter

The positional parameter immediately follow 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 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 via 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 240 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 performed. 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 resides on local shadow volumes. Note that an IBM Systems Storage SAN Volume Controller, DS8000, the XIV system, or 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 that resides on local shadow volumes if the backup exists on volumes that support it. This is the default.

No Use file level copy to restore the files from a VSS Backup that resides on local shadow volumes. Note that bypassing volume-level copy means that Exchange storage group files, log files, and the checkpoint file are the only data overwritten on the source volumes.

When performing VSS Instant Restores with DS8000 or SAN Volume Controller 4.2.x or 4.3.x, make sure that any previous background copies (that involve the volumes being restored) are completed prior to initiating the VSS Instant Restore. Be aware that 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.

In a CCR environment, suspend the storage group copy (Exchange Server 2003 and Exchange Server 2007) or database copy (Exchange Server 2010) before performing the VSS Instant Restore. After the VSS Instant Restore completes, resume the storage group or database copy.

/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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager GUI or the **update config** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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. date and time to mount the backup from. 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 is 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 taken 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 establishes the restore period.
- If you specify *date* and you do not specify *time*, *time* defaults to a value of 23:59:59. This establishes the *date* at the specified date.
- If you specify *time* without *date*, then *date* defaults to the current date. This 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 which 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 is 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 taken 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 establishes the restore period.
- If you specify *date* and you do not specify *time*, *time* defaults to a value of 23:59:59. This establishes the *date* at the specified date.
- If you specify *time* without *date*, then *date* defaults to the current date. This 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), you do not need to supply the password 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 has not yet been 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 using 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 3, Release 1, Level 0.0
(C) Copyright IBM Corporation 2009, 2011. 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=10/07/2011 /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 3, Release 1, Level 0.0
(C) Copyright IBM Corporation 2009, 2011. 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:

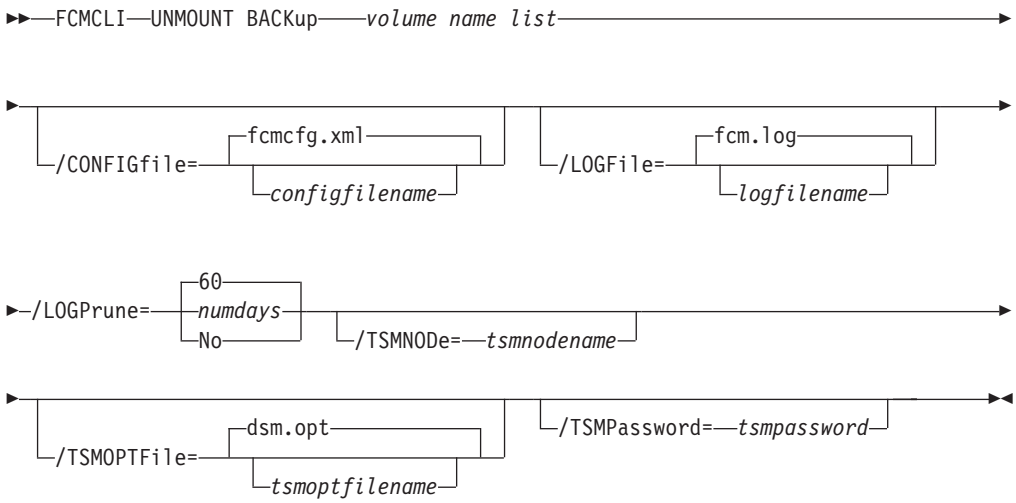
```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 3, Release 1, Level 0.0
(C) Copyright IBM Corporation 2009, 2011. All rights reserved.



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 have been 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.



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 the names of the mounted volumes 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"
```

See "Update Config positional parameters" on page 240 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. 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**

Use the **/logprune** parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. 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. You can use the Tivoli Storage FlashCopy Manager GUI or the **update config** command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the **/logprune** parameter to override these defaults. When the value of the **/logprune** variable *numdays* is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the **timeformat** or **dateformat** parameter can result in the log file being pruned unintentionally. If the value of the **timeformat** or **dateformat** parameter has changed, prior to issuing a Tivoli Storage FlashCopy Manager command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- 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), you do not need to supply the password 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 has not yet been 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 using the **unmount backup** command.

In this example, the `fcmcli unmount backup M:,N:` command unmounts backups `M:` and `N:` The following output is displayed:

```
FlashCopy Manager for Windows:
IBM Tivoli Storage FlashCopy Manager
Version 3, Release 1, Level 0.0
(C) Copyright IBM Corporation 2009, 2011. 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)
```

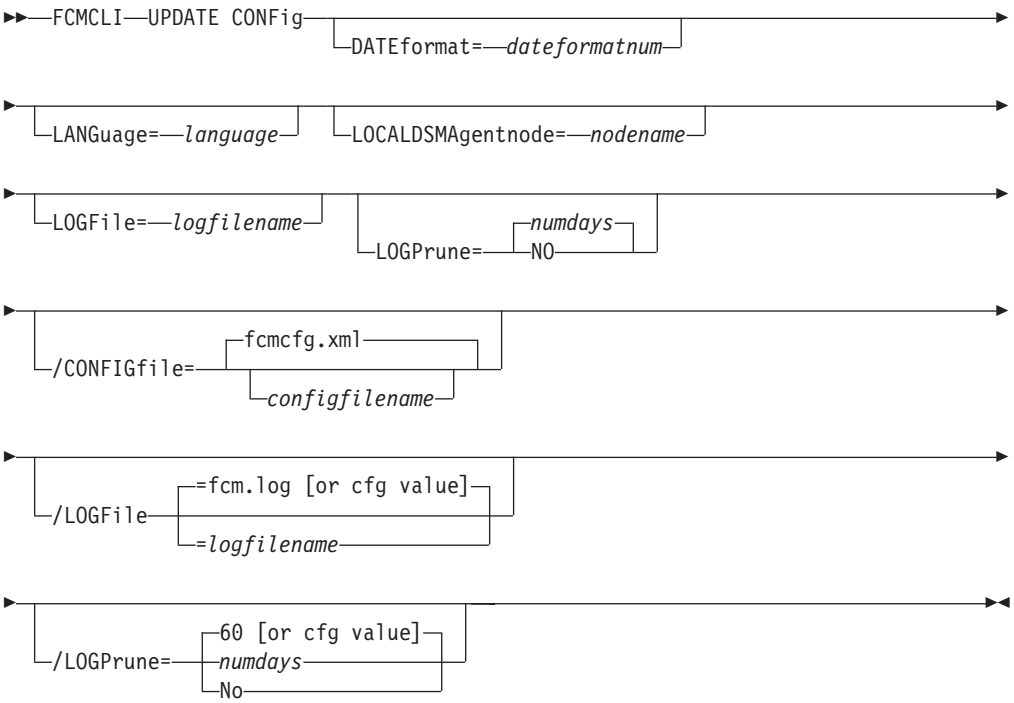
Update Config command

Use the **update config** command to set the Tivoli Storage FlashCopy Manager or Tivoli Storage Manager configuration parameters defined in the configuration file, *fcmcfg.xml* by default.

For command invocations other than this command or the **Configuration** task in the **Edit Menu** of the Tivoli Storage FlashCopy Manager GUI, the value of a configuration parameter that is specified in a command invocation 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 Tivoli Storage FlashCopy Manager configuration file (fcmcfg.xml) are used.

Update Config syntax

Use the **update config** command syntax diagrams as a reference to view available options and truncation requirements.



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 is the default.

2 DD-MM-YYYY

3 YYYY-MM-DD

4 DD.MM.YYYY

5 YYYY.MM.DD

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 performing one of the following:

- After changing the value of the **dateformat** parameter, make a copy of the existing log file before running Tivoli Storage FlashCopy Manager.
- 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 American English (This 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 machine that performs 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 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**

Use the LOGPrune positional parameter to disable log pruning or to set log pruning parameters. By default, log pruning is enabled and performed once per day. The *numdays* variable represents the number of days to save

log entries. You can specify a value of **No** or *0* through *9999*. By default, **60** days of log entries are saved in the pruning process.

NUMberformat=*fmtnum*
Use the NUMberformat positional parameter to specify the format you want to use to display numbers.

The *fmtnum* variable displays numbers using one of the following formats. Select the format number that corresponds to the format you want to use.

1 n,nnn.dd. This is the default.

2 n,nnn,dd.

3 n nnn,dd

4 n nnn.dd

5 n.nnn,dd

6 n'nnn,dd

TIMEformat=*formatnumber*
Use the TIMEformat positional parameter to specify the format in which you want system time 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 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"
```

See “Update Config positional parameters” on page 240 for descriptions of available configuration parameters.

Update Config Example

This output example provides a sample of the text, messages, and process status that displays when using the **update config** command.

The **fcmcli update config localdsmagentnode=server12** command sets the node name `server12` as the local machine that performs the VSS backups. An example of the output is displayed below.

```
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 displayed below.

```
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 machine 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 displayed below.

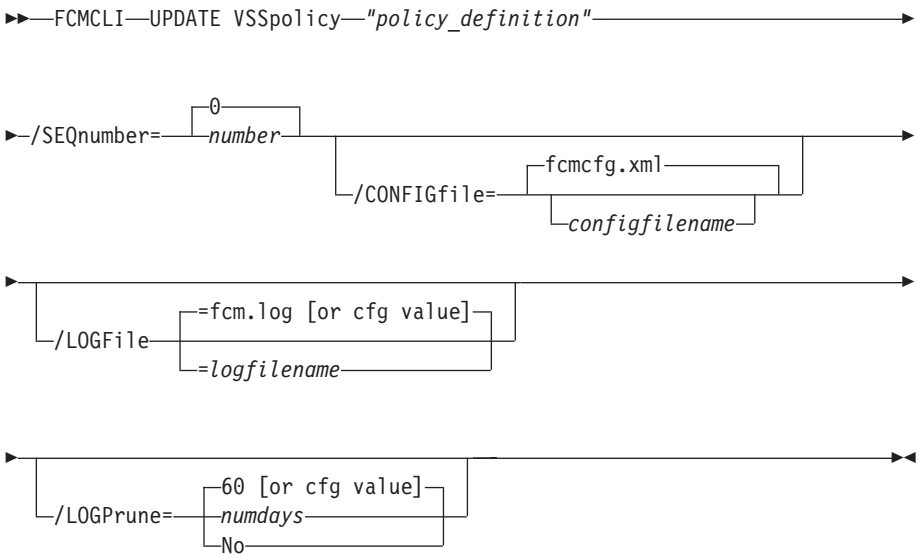
```
FMX5054I The preference has been set successfully.
```

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.



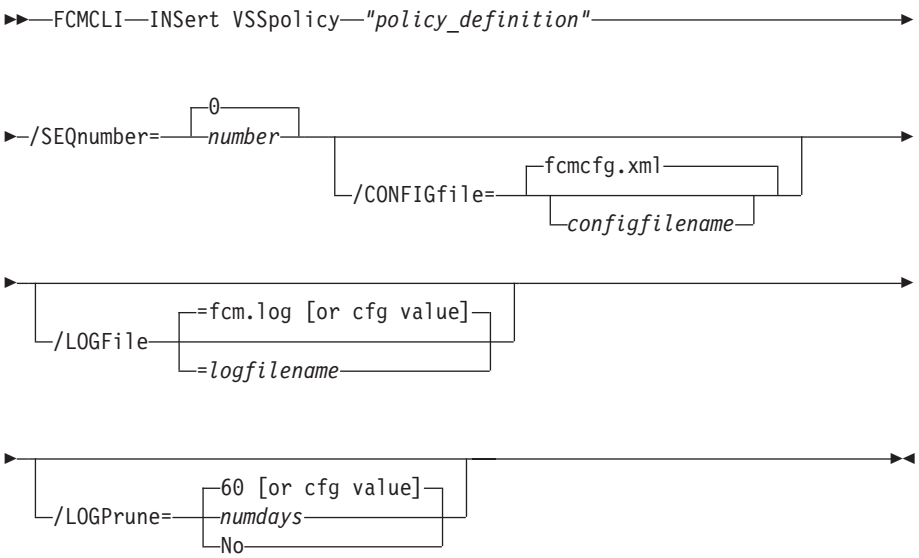
Parameters:

- ***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. If the value of *number* is 0 (default) or is greater than the number of existing VSS policy binding statements, the policy definition is added as a new 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 specified by the **/seqnumber** parameter.

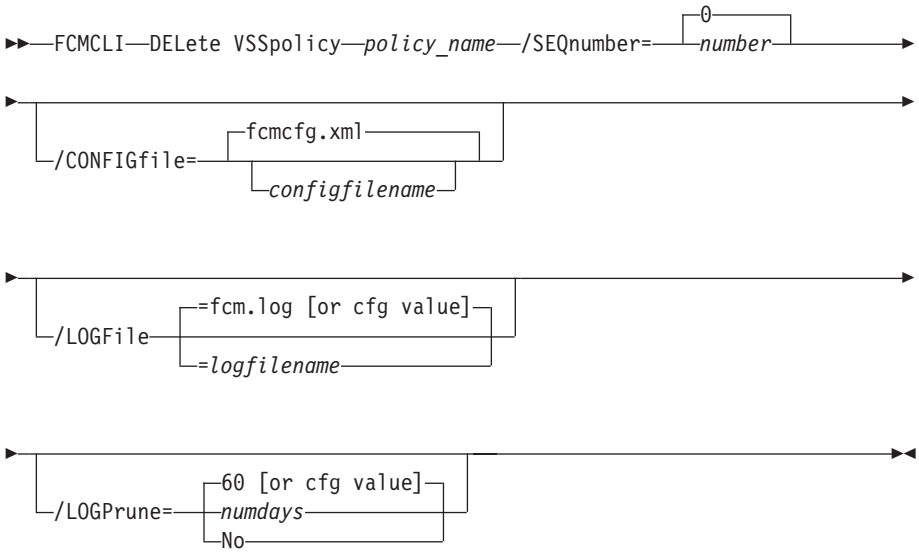


Parameters:

- **policy_definition**: Specifies the name of the VSS policy binding statement to insert.
- **SEQnumber**: Specifies the sequence priority for the inserted policy binding statement. If the value of *number* is 0 (default) or is greater than the number of existing VSS policy binding statements, the policy definition is added as a new statement.
- **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 specified by the **/seqnumber** parameter.

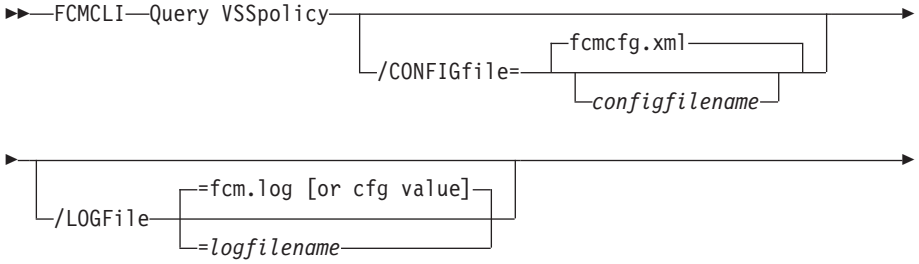


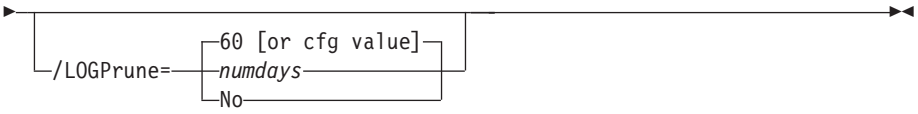
Parameters:

- **policy_definition**: Specifies the name of the VSS policy binding statement to delete.
- **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.





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.

Tivoli Storage FlashCopy Manager VSS Policy Command Examples

These output examples provide a sample of the text, messages, and process status that displays when using 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 following list includes the major accessibility features in the Tivoli Storage Manager family of products:

- Keyboard-only operation
- Interfaces that are commonly used by screen readers
- Keys that are discernible by touch but do not activate just by touching them
- Industry-standard devices for ports and connectors
- The attachment of alternative input and output devices

The Tivoli Storage Manager Information Center, and its related publications, are accessibility-enabled. The accessibility features of the information center are described at http://publib.boulder.ibm.com/infocenter/tsminfo/v6r3/topic/com.ibm.help.ic.doc/iehs36_accessibility.html.

Keyboard navigation

On Windows, the Tivoli Storage Manager product family follows Microsoft conventions for all keyboard navigation and access. Drag and Drop support is managed using the Microsoft Windows Accessibility option known as MouseKeys. For more information about MouseKeys and other Windows accessibility options, please refer to the Windows online help (keyword: MouseKeys).

On other operating systems, these products follow the operating-system conventions for keyboard navigation and access.

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 for more information about the commitment that IBM has to accessibility.

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Glossary

This glossary includes terms and definitions for IBM Tivoli Storage Manager and IBM Tivoli Storage FlashCopy Manager products.

To view glossaries for other IBM products, go to http://www.ibm.com/software/globalization/terminology/.

The following cross-references are used in this glossary:

- *See* refers the reader from a term to a preferred synonym, or from an acronym or abbreviation to the defined full form.
- *See also* refers the reader to a related or contrasting term.

A

absolute mode
In storage management, a backup copy-group mode that specifies that a file is considered for incremental backup even if the file has not changed since the last backup. See also *modified mode*.

access control list (ACL)
In computer security, a list associated with an object that identifies all the subjects that can access the object and their access rights. For example, an access control list is associated with a file that identifies the users who can access that file and their access rights.

access mode
An attribute of a storage pool or a storage volume that specifies whether the server can write to or read from the storage pool or storage volume. The access mode can be read/write, read-only, or unavailable. Volumes in primary storage pools can also have an access mode of destroyed. Volumes in copy storage pools can also have an access mode of offsite.

acknowledgment
The transmission of acknowledgment characters as a positive response to a data transmission.

ACL See *access control list*.

activate
To validate the contents of a policy set and then make it the active policy set.

active-data pool
A named set of storage pool volumes that contain only active versions of client backup data.

active file system
A file system to which space management has been added. With space management, tasks for an active file system include automatic migration, reconciliation, selective migration, and recall. Contrast with *inactive file system*.

active policy set
The activated policy set that contains the policy rules in use by all client nodes that are assigned to the policy domain. See also *policy domain* and *policy set*.

active version
The most recent backup copy of a file stored. The active version of a file cannot be deleted until a backup process detects that the user has either replaced the file with a newer version or has deleted the file from the file server or workstation. Contrast with *inactive version*.

activity log
A log that records normal activity messages that are generated by the server. These messages include information about server and client operations, such as the start time of sessions or device I/O errors.

adaptive subfile backup
A type of backup that sends only changed portions of a file to the server, instead of sending the entire file. Adaptive subfile backup reduces network traffic and increases the speed of the backup.

administrative client
A program that runs on a file server, workstation, or mainframe that administrators use to control and monitor the Tivoli Storage Manager server. Contrast with *backup-archive client*.

administrative command schedule
A database record that describes the

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planned processing of an administrative command during a specific time period. See also *client schedule*.

administrative privilege class
See *privilege class*.

administrative session
A period of time during which an administrator user ID communicates with a server to perform administrative tasks. Contrast with *client node session*.

administrator
A user who is registered to the server as an administrator, and who is authorized to perform tasks and issue commands through the assignment of an administrative privilege class.

Advanced Program-to-Program Communication (APPC)
An implementation of the SNA LU 6.2 protocol that allows interconnected systems to communicate and share the processing of programs.

agent node
A client node that has been granted proxy authority to perform operations on behalf of another client node, which is the target node.

aggregate
An object, stored in one or more storage pools, consisting of a group of logical files that are packaged together. See also *logical file* and *physical file*.

aggregate data transfer rate
A performance statistic that indicates the average number of bytes that were transferred per second while processing a given operation.

APPC See *Advanced Program-to-Program Communication*.

application client
A program that is installed on a system to protect an application. The Tivoli Storage Manager server provides backup services to an application client.

archive
To copy programs, data, or files to other storage media, usually for long-term storage or security. Contrast with *retrieve*.

archive copy
A file or group of files that was archived to server storage.

archive copy group
A policy object containing attributes that control the generation, destination, and expiration of archived files.

archive-retention grace period
The number of days that the storage manager retains an archived file when the server is unable to rebind the file to an appropriate management class. See also *bind*.

association
(1) The defined relationship between a client node and a client schedule. An association identifies the name of a schedule, the name of the policy domain to which the schedule belongs, and the name of a client node that performs scheduled operations.

(2) On a configuration manager, the defined relationship between a profile and an object such as a policy domain. Profile associations define the configuration information that is distributed to a managed server when it subscribes to the profile.

audit To check for logical inconsistencies between information that the server has and the actual condition of the system. The storage manager can audit information about items such as volumes, libraries, and licenses. For example, when a storage manager audits a volume, the server checks for inconsistencies between information about backed-up or archived files that are stored in the database and the actual data that are associated with each backup version or archive copy in server storage.

authentication
The process of checking a user's password before permitting user access to the Tivoli Storage Manager server. Authentication can be turned on or off by an administrator with system privilege.

authentication rule
A specification that another user can use to either restore or retrieve files from storage.

authority
The right to access objects, resources, or functions. See also *privilege class*.

authorization rule
A specification that permits another user to either restore or retrieve a user's files from storage.

authorized user
A user who has administrative authority for the Tivoli Storage Manager client on a workstation. This user changes passwords, performs open registrations, and deletes file spaces.

AutoFS
See *automounted file system*.

automatic detection
A feature that detects, reports, and updates the serial number of a drive or library in the database when the path from the local server is defined.

automatic migration
The process that is used to automatically move files from a local file system to storage, based on options and settings that are chosen by a root user on a workstation. See also *threshold migration* and *demand migration*.

automatic reconciliation
The process that is used to reconcile file systems at regular intervals. The intervals are set by a user with root user authority. See also *reconciliation*.

automounted file system (AutoFS)
A file system that is managed by an automounter daemon. The automounter daemon monitors a specified directory path, and automatically mounts the file system to access data.

B

backup-archive client
A program that runs on a workstation or file server and provides a means for users to back up, archive, restore, and retrieve files. Contrast with *administrative client*.

backup copy group
A policy object containing attributes that control the generation, destination, and expiration of backup versions of files. A backup copy group belongs to a management class.

backup-retention grace period
The number of days the storage manager retains a backup version after the server is unable to rebind the file to an appropriate management class.

backup set
A portable, consolidated group of active versions of backup files that are generated for a backup-archive client.

backup set collection
A group of backup sets that are created at the same time and which have the same backup set name, volume names, description, and device classes. The server identifies each backup set in the collection by its node name, backup set name, and file type.

backup version
A file or directory that a client node backed up to server storage. More than one backup version can exist in server storage, but only one backup version is the active version. See also *active version* and *inactive version*.

bind To associate all versions of a file with a management class name. See *rebind*.

bindery
A database that consists of three system files for a NetWare server. The files contain user IDs and user restrictions.

C

cache To place a duplicate copy of a file on random access media when the server migrates a file to another storage pool in the hierarchy.

cache file
A snapshot of a logical volume created by Logical Volume Snapshot Agent. Blocks are saved immediately before they are modified during the image backup and their logical extents are saved in the cache files.

CAD See *client acceptor*.

central scheduler
A function that permits an administrator to schedule client operations and administrative commands. The operations can be scheduled to occur periodically or on a specific date. See *client schedule* and *administrative command schedule*.

client A software program or computer that requests services from a server.

client acceptor
An HTTP service that serves the applet for the web client to web browsers. On Windows systems, the client acceptor is installed and run as a service. On AIX®, UNIX, and Linux systems, the client acceptor is run as a daemon, and is also called the *client acceptor daemon* (CAD).

client acceptor daemon (CAD)
See *client acceptor*.

client domain
The set of drives, file systems, or volumes that the user selects to back up or archive data, using the backup-archive client.

client node
A file server or workstation on which the backup-archive client program has been installed, and which has been registered to the server.

client node session
A session in which a client node communicates with a server to perform backup, restore, archive, retrieve, migrate, or recall requests. Contrast with *administrative session*.

client options file
An editable file that identifies the server and communication method, and provides the configuration for backup, archive, hierarchical storage management, and scheduling.

client option set
A group of options that are defined on the server and used on client nodes in conjunction with client options files.

client-polling scheduling mode
A method of operation in which the client queries the server for work. Contrast with *server-prompted scheduling mode*.

client schedule
A database record that describes the planned processing of a client operation during a specific time period. The client operation can be a backup, archive, restore, or retrieve operation, a client operating system command, or a macro. See also *administrative command schedule*.

client/server
Pertaining to the model of interaction in distributed data processing in which a program on one computer sends a request to a program on another computer and awaits a response. The requesting program is called a client; the answering program is called a server.

client system-options file
A file, used on AIX, UNIX, or Linux system clients, containing a set of processing options that identify the servers to be contacted for services. This file also specifies communication methods and options for backup, archive, hierarchical storage management, and scheduling. This file is also called the dsm.sys file. See also *client user-options file*.

client user-options file
A file that contains the set of processing options that the clients on the system use. The set can include options that determine the server that the client contacts, and options that affect backup operations, archive operations, hierarchical storage management operations, and scheduled operations. This file is also called the dsm.opt file. For AIX, UNIX, or Linux systems, see also *client system-options file*.

closed registration
A registration process in which only an administrator can register workstations as client nodes with the server. Contrast with *open registration*.

collocation
The process of keeping all data belonging to a single-client file space, a single client node, or a group of client nodes on a minimal number of sequential-access volumes within a storage pool. Collocation can reduce the number of volumes that must be accessed when a large amount of data must be restored.

collocation group
A user-defined group of client nodes whose data is stored on a minimal number of volumes through the process of collocation.

commit point
A point in time when data is considered consistent.

Common Programming Interface for Communications (CPI-C)
A call-level interface that provides a consistent application programming interface (API) for applications that use program-to-program communications. CPI-C uses LU 6.2 architecture to create a set of interprogram services that can establish and end a conversation, send and receive data, exchange control information, and notify a partner program of errors.

communication method
The method by which a client and server exchange information. See also *Transmission Control Protocol/Internet Protocol*.

communication protocol
A set of defined interfaces that permit computers to communicate with each other.

compression
A function that removes repetitive characters, spaces, or strings of characters from the data being processed and replaces the repetitive characters with control characters. Compression reduces the amount of storage space that is required for the data.

configuration manager
A server that distributes configuration information, such as policies and schedules, to managed servers according to their profiles. Configuration information can include policy and schedules. See also *managed server* and *profile*.

conversation
A connection between two programs over a session that allows them to communicate with each other while processing a transaction.

copy backup
A full backup in which the transaction log files are not deleted so that backup procedures that use incremental or differential backups are not disrupted

copy group
A policy object containing attributes that control how backup versions or archive copies are generated, where backup versions or archive copies are initially located, and when backup versions or archive copies expire. A copy group belongs to a management class. See also *archive copy group*, *backup copy group*, *backup version*, and *management class*.

copy storage pool
A named set of volumes that contain copies of files that reside in primary storage pools. Copy storage pools are used only to back up the data that is stored in primary storage pools. A copy storage pool cannot be a destination for a backup copy group, an archive copy group, or a management class (for space-managed files). See also *primary storage pool* and *destination*.

CPI-C See *Common Programming Interface for Communications*.

D

daemon
A program that runs unattended to perform continuous or periodic functions, such as network control.

damaged file
A physical file in which Tivoli Storage Manager has detected read errors.

data access control mode
A mode that controls whether a command can access a migrated file, see a migrated file as zero-length, or receive an input/output error if it attempts to access a migrated file. See also *execution mode*.

database backup series
One full backup of the database, plus up to 32 incremental backups made since that full backup. Each full backup that is run starts a new database backup series. A number identifies each backup series.

database snapshot
A complete backup of the entire database to media that can be taken off-site. When a database snapshot is created, the current database backup series is not interrupted. A database snapshot cannot have incremental database backups associated with it. See also *database backup series*. Contrast with *full backup*.

data deduplication
A method of reducing storage needs by eliminating redundant data. Only one instance of the data is retained on storage

media. Other instances of the same data are replaced with a pointer to the retained instance.

data manager server
A server that collects metadata information for client inventory and manages transactions for the storage agent over the local area network. The data manager server informs the storage agent with applicable library attributes and the target volume identifier.

data mover
A device that moves data on behalf of the server. A network-attached storage (NAS) file server is a data mover.

data storage-management application-programming interface (DSMAPI)
A set of functions and semantics that can monitor events on files, and manage and maintain the data in a file. In an HSM environment, a DSMAPI uses events to notify data management applications about operations on files, stores arbitrary attribute information with a file, supports managed regions in a file, and uses DSMAPI access rights to control access to a file object.

default management class
A management class that is assigned to a policy set. This class is used to govern backed up or archived files when a file is not explicitly associated with a specific management class through the include-exclude list.

deduplication
See *data deduplication.*

demand migration
The process that is used to respond to an out-of-space condition on a file system for which hierarchical storage management (HSM) is active. Files are migrated to server storage until space usage drops to the low threshold that was set for the file system. If the high threshold and low threshold are the same, one file is migrated.

desktop client
The group of backup-archive clients that includes clients on Microsoft Windows, Apple, and Novell NetWare operating systems.

destination
A copy group or management class attribute that specifies the primary storage pool to which a client file will be backed up, archived, or migrated.

device class
A named set of characteristics that are applied to a group of storage devices. Each device class has a unique name and represents a device type of disk, file, optical disk, or tape.

device configuration file
(1) For a server, a file that contains information about defined device classes, and, on some servers, defined libraries and drives. The information is a copy of the device configuration information in the database.

(2) For a storage agent, a file that contains the name and password of the storage agent, and information about the server that is managing the SAN-attached libraries and drives that the storage agent uses.

device driver
A program that provides an interface between a specific device and the application program that uses the device.

disaster recovery manager (DRM)
A function that assists in preparing and using a disaster recovery plan file for the server.

disaster recovery plan
A file that is created by the disaster recovery manager (DRM) that contains information about how to recover computer systems if a disaster occurs and scripts that can be run to perform some recovery tasks. The file includes information about the software and hardware that is used by the server, and the location of recovery media.

domain
A grouping of client nodes with one or more policy sets, which manage data or storage resources for the client nodes. See *policy domain* or *client domain*.

DRM See *disaster recovery manager*.

DSMAPI
See *data storage-management application-programming interface*.

dynamic serialization
A type of copy serialization in which a file or folder is backed up or archived on the first attempt regardless of whether it changes during a backup or archive.

E

EA See *extended attribute*.

EB See *exabyte*.

EFS See *Encrypted File System*.

Encrypted File System (EFS)
A file system that uses file system-level encryption.

enterprise configuration
A method of setting up servers so that the administrator can distribute the configuration of one of the servers to the other servers, using server-to-server communication. See also *configuration manager*, *managed server*, *profile*, and *subscription*.

enterprise logging
The process of sending events from a Tivoli Storage Manager server to a designated event server. The event server routes the events to designated receivers, such as to a user exit. See also *event*.

error log
A data set or file that is used to record error information about a product or system.

estimated capacity
The available space, in megabytes, of a storage pool.

event (1) An administrative command or a client operation that is scheduled to be run using Tivoli Storage Manager scheduling.

(2) A message that an Tivoli Storage Manager server or client issues. Messages can be logged using Tivoli Storage Manager event logging.

event record
A database record that describes actual status and results for events.

event server
A server to which other servers can send events for logging. The event server routes the events to any receivers that are enabled for the sending server's events.

exabyte (EB)
For processor storage, real and virtual storage, and channel volume, 1 152 921 504 606 846 976 bytes. For disk storage capacity and communications volume, 1 000 000 000 000 000 000 bytes.

exclude
The process of identifying files in an include-exclude list. This process prevents the files from being backed up or migrated whenever a user or schedule enters an incremental or selective backup operation. A file can be excluded from backup and space management, backup only, or space management only.

exclude-include list
See *include-exclude list*.

execution mode
A mode that controls the space-management related behavior of commands that run under the **dsmmode** command.

expiration
The process by which files, data sets, or objects are identified for deletion because their expiration date or retention period has passed.

expiring file
A migrated or premigrated file that has been marked for expiration and removal from storage. If a stub file or an original copy of a premigrated file is deleted from a local file system, or if the original copy of a premigrated file is updated, the corresponding migrated or premigrated file is marked for expiration the next time reconciliation is run.

extend
To increase the portion of available space that can be used to store database or recovery log information.

extended attribute (EA)
Names or value pairs that are associated with files or directories. There are three classes of extended attributes: user attributes, system attributes, and trusted attributes.

extent The part of a file that is created during the data-deduplication process. Extents are compared with other file extents to identify duplicates.

external library
A type of library that is provided by Tivoli Storage Manager that permits LAN-free data movement for StorageTek libraries that are managed by Automated Cartridge System Library Software (ACSLS). To activate this function, the Tivoli Storage Manager library type must be EXTERNAL.

F

file access time
On AIX, UNIX, or Linux systems, the time when the file was last accessed.

file age
For migration prioritization purposes, the number of days since a file was last accessed.

file device type
A device type that specifies the use of sequential access files on disk storage as volumes.

file server
A dedicated computer and its peripheral storage devices that are connected to a local area network that stores programs and files that are shared by users on the network.

file space
A logical space in server storage that contains a group of files that have been backed up or archived by a client node, from a single logical partition, file system, or virtual mount point. Client nodes can restore, retrieve, or delete their file spaces from server storage. In server storage, files belonging to a single file space are not necessarily stored together.

file space ID (FSID)
A unique numeric identifier that the server assigns to a file space when it is stored in server storage.

file state
The space management mode of a file that resides in a file system to which space management has been added. A file can be in one of three states: resident, premigrated, or migrated. See also *resident file*, *premigrated file*, and *migrated file*.

file system migrator (FSM)
A kernel extension that intercepts all file system operations and provides any space management support that is required. If no space management support is required, the operation is passed to the operating system, which performs its normal functions. The file system migrator is mounted over a file system when space management is added to the file system.

file system state
The storage management mode of a file system that resides on a workstation on which the hierarchical storage management (HSM) client is installed. A file system can be in one of these states: native, active, inactive, or global inactive.

frequency
A copy group attribute that specifies the minimum interval, in days, between incremental backups.

FSID See *file space ID*.

FSM See *file system migrator*.

full backup
The process of backing up the entire server database. A full backup begins a new database backup series. See also *database backup series* and *incremental backup*. Contrast with *database snapshot*.

fuzzy backup
A backup version of a file that might not accurately reflect what is currently in the file because the file was backed up at the same time as it was being modified.

fuzzy copy
A backup version or archive copy of a file that might not accurately reflect the original contents of the file because it was backed up or archived the file while the file was being modified. See also *backup version* and *archive copy*.

G

General Parallel File System
A high-performance shared-disk file system that can provide data access from nodes in a cluster environment.

gigabyte (GB)
In decimal notation, 1 073 741 824 when referring to memory capacity; in all other cases, it is defined as 1 000 000 000.

global inactive state
The state of all file systems to which

space management has been added when space management is globally deactivated for a client node. When space management is globally deactivated, hierarchical storage management (HSM) cannot perform migration, recall, or reconciliation. However, a root user can update space management settings and add space management to additional file systems. Users can access resident and premigrated files.

Globally Unique Identifier (GUID)
An algorithmically determined number that uniquely identifies an entity within a system.

GPFS™
See *General Parallel File System*.

GPFS node set
A mounted, defined group of GPFS file systems.

group backup
The backup of a group containing a list of files from one or more file space origins.

GUID See *Globally Unique Identifier*.

H

hierarchical storage management (HSM)
A function that automatically distributes and manages data on disk, tape, or both by regarding devices of these types and potentially others as levels in a storage hierarchy that range from fast, expensive devices to slower, cheaper, and possibly removable devices. The objectives are to minimize access time to data and maximize available media capacity.

hierarchical storage management (HSM) client
A client program that works with the Tivoli Storage Manager server to provide hierarchical storage management (HSM) for a system. See also *hierarchical storage management* and *space manager client*.

HSM See *hierarchical storage management*.

HSM client
See *hierarchical storage management client*.

I

ILM See *information lifecycle management*.

image A file system or raw logical volume that is backed up as a single object.

image backup
A backup of a full file system or raw logical volume as a single object.

inactive file system
A file system for which space management has been deactivated. Contrast with *active file system*.

inactive version
A backup version of a file that is either not the most recent backup version, or that is a backup version of a file that no longer exists on the client system. Inactive backup versions are eligible for expiration processing according to the management class assigned to the file. Contrast with *active version*.

include-exclude file
A file containing statements to determine the files to back up and the associated management classes to use for backup or archive. See also *include-exclude list*.

include-exclude list
A list of options that include or exclude selected files for backup. An exclude option identifies files that should not be backed up. An include option identifies files that are exempt from the exclusion rules or assigns a management class to a file or a group of files for backup or archive services.

incremental backup
(1) A copy of all database data that has changed since the most recent successful full backup operation. An incremental backup is also known as a *cumulative backup image* because each incremental backup includes the contents of the previous incremental backup.

(2) The process of backing up information in the database that is new or changed since the last full backup. Contrast with *full backup*. See also *database backup series*.

(3) For Data Protection for Microsoft Exchange Server, a backup in which the transaction logs are backed up and then cleared.

individual mailbox restore
See *mailbox restore*.

information lifecycle management (ILM)
GPFS policy-based file management for storage pools and file sets.

inode The internal structure that describes the individual files on AIX, UNIX, or Linux systems. An inode contains the node, type, owner, and location of a file.

inode number
A number specifying a particular inode file in the file system.

IP address
A unique address for a device or logical unit on a network that uses the IP standard.

J

job file
A generated file that contains configuration information for a migration job. The file is XML format and can be created and edited in the hierarchical storage management (HSM) client for Windows client graphical user interface.

journal-based backup
A method for backing up Windows clients and AIX clients that exploits the change notification mechanism in a file to improve incremental backup performance by reducing the need to fully scan the file system.

journal daemon
On AIX, UNIX, or Linux systems, a program that tracks change activity for files residing in file systems.

journal service
In Microsoft Windows, a program that tracks change activity for files residing in file systems.

K

kilobyte (KB)
For processor storage, real and virtual storage, and channel volume, 210 or 1 024 bytes. For disk storage capacity and communications volume, 1 000 bytes.

L

LAN See *local area network*.

LAN-free data movement
The movement of client data between a client system and a storage device on a storage area network (SAN), bypassing the local area network. This process is also referred to as *LAN-free data transfer*.

LAN-free data transfer
See *LAN-free data movement*.

leader data
Bytes of data, from the beginning of a migrated file, that are stored in the file's corresponding stub file on the local file system. The amount of leader data that is stored in a stub file depends on the stub size that is specified.

library
(1) A repository for demountable recorded media, such as magnetic disks and magnetic tapes.

(2) A collection of one or more drives, and possibly robotic devices (depending on the library type), which can be used to access storage volumes.

library client
A server that uses server-to-server communication to access a library that is managed by another storage management server. See also *library manager*.

library manager
A server that controls device operations when multiple storage management servers share a storage device. See also *library client*.

local (1) Pertaining to a device, file, or system that is accessed directly from a user system, without the use of a communication line.

(2) For HSM products, pertaining to the destination of migrated files that are being moved.

local area network (LAN)
A network that connects several devices in a limited area (such as a single building or campus) and that can be connected to a larger network.

local shadow volumes
Data that is stored on shadow volumes localized to a disk storage subsystem.

LOFS See *loopback virtual file system.*

logical file
A file that is stored in one or more server storage pools, either by itself or as part of an aggregate. See also *aggregate* and *physical file*.

logical occupancy
The space that is used by logical files in a

storage pool. This space does not include the unused space created when logical files are deleted from aggregate files, so it might be less than the physical occupancy.

logical unit (LU)
An access point through which a user or application program accesses the Systems Network Architecture (SNA) network to communicate with another user or application program.

logical unit number (LUN)
In the Small Computer System Interface (SCSI) standard, a unique identifier that is used to differentiate devices, each of which is a logical unit (LU).

logical volume
A portion of a physical volume that contains a file system.

logical volume backup
A backup of a file system or logical volume as a single object.

Logical Volume Snapshot Agent (LVSA)
Software that can act as the snapshot provider for creating a snapshot of a logical volume during an online image backup.

loopback virtual file system (LOFS)
A file system that is created by mounting a directory over another local directory, also known as mount-over-mount. A LOFS can also be generated using an automounter.

LU See *logical unit*.

LUN See *logical unit number*.

LVSA See *Logical Volume Snapshot Agent*.

M

macro file
A file that contains one or more storage manager administrative commands, which can be run only from an administrative client using the MACRO command. Contrast with *Tivoli Storage Manager command script*.

mailbox restore
A function that restores Microsoft Exchange Server data (from IBM Data Protection for Microsoft Exchange backups) at the mailbox level or mailbox-item level.

managed object
In Tivoli Storage Manager, a definition in the database of a managed server that was distributed to the managed server by a configuration manager. When a managed server subscribes to a profile, all objects that are associated with that profile become managed objects in the database of the managed server. In general, a managed object cannot be modified locally on the managed server. Objects can include policy, schedules, client option sets, server scripts, administrator registrations, server definitions, and server group definitions.

managed server
A Tivoli Storage Manager server that receives configuration information from a configuration manager using a subscription to one or more profiles. Configuration information can include definitions of objects such as policy and schedules. See also *configuration manager*, *subscription*, and *profile*.

management class
A policy object that users can bind to each file to specify how the server manages the file. The management class can contain a backup copy group, an archive copy group, and space management attributes. See also *copy group*, *space manager client*, *bind*, and *rebind*.

maximum transmission unit
The largest possible unit of data that can be sent on a given physical medium in a single frame. For example, the maximum transmission unit for Ethernet is 1500 bytes.

MB See *megabyte*.

media server
In a z/OS® environment, a program that provides access to z/OS disk and tape storage for Tivoli Storage Manager servers that run on operating systems other than z/OS.

megabyte (MB)
(1) 1 048 576 bytes (2 to the 20th power) when used in this publication.

(2) For processor storage, real and virtual storage, and channel volume, 2 to the power of 20 or 1 048 576 bits. For disk

storage capacity and communications volume, 1 000 000 bits.

metadata
Data that describes the characteristics of data; descriptive data.

migrate
To move data from one storage location to another. In Tivoli Storage Manager products, migrating can mean moving data from a client node to server storage, or moving data from one storage pool to the next storage pool defined in the server storage hierarchy. In both cases the movement is controlled by policy, such as thresholds that are set. See also *migration threshold*.

migrated file
A file that has been copied from a local file system to Tivoli Storage Manager storage. For HSM clients on UNIX or Linux systems, the file is replaced with a stub file on the local file system. On Windows systems, creation of the stub file is optional. See also *stub file* and *resident file*. For HSM clients on UNIX or Linux systems, contrast with *premigrated file*.

migrate-on-close recall mode
A mode that causes a migrated file to be recalled back to its originating file system temporarily. Contrast with *normal recall mode* and *read-without-recall recall mode*.

migration job
A specification of files to migrate, and actions to perform on the original files after migration. See also *job file*.

migration threshold
High and low capacities for storage pools or file systems, expressed as percentages, at which migration is set to start and stop.

mirroring
The process of writing the same data to multiple locations at the same time. Mirroring data protects against data loss within the recovery log.

mode A copy group attribute that specifies whether to back up a file that has not been modified since the last time the file was backed up. See *modified mode* and *absolute mode*.

modified mode
In storage management, a backup copy-group mode that specifies that a file is considered for incremental backup only if it has changed since the last backup. A file is considered a changed file if the date, size, owner, or permissions of the file have changed. See also *absolute mode*.

mount limit
The maximum number of volumes that can be simultaneously accessed from the same device class. The mount limit determines the maximum number of mount points. See also *mount point*.

mount point
On the Tivoli Storage Manager server, a logical drive through which volumes in a sequential access device class are accessed. For removable-media device types, such as tape, a mount point is a logical drive that is associated with a physical drive. For the file device type, a mount point is a logical drive that is associated with an I/O stream. The number of mount points for a device class is defined by the value of the mount limit attribute for that device class. See also *mount limit*.

mount retention period
The maximum number of minutes that the server retains a mounted sequential-access media volume that is not being used before it dismounts the sequential-access media volume.

mount wait period
The maximum number of minutes that the server waits for a sequential-access volume mount request to be satisfied before canceling the request.

MTU See *maximum transmission unit*.

N

Nagle algorithm
An algorithm that reduces congestion of TCP/IP networks by combining smaller packets and sending them together.

named pipe
A type of interprocess communication that permits message data streams to pass between peer processes, such as between a client and a server.

NAS See *network-attached storage*.

NAS node
A client node that is a network-attached storage (NAS) file server. Data for the NAS node is transferred by a NAS file server that is controlled by the network data management protocol (NDMP). A NAS node is also called a NAS file server node.

native file system
A file system that is locally added to the file server and is not added for space management. The hierarchical storage manager (HSM) client does not provide space management services to the file system.

native format
A format of data that is written to a storage pool directly by the Tivoli Storage Manager server. Contrast with *non-native data format*.

NDMP
See *Network Data Management Protocol*.

NetBIOS
See *Network Basic Input/Output System*.

network-attached storage (NAS) file server
A dedicated storage device with an operating system that is optimized for file-serving functions. A NAS file server can have the characteristics of both a node and a data mover.

Network Basic Input/Output System (NetBIOS)
A standard interface to networks and personal computers that is used on local area networks to provide message, print-server, and file-server functions. Application programs that use NetBIOS do not have to handle the details of LAN data link control (DLC) protocols.

Network Data Management Protocol (NDMP)
A protocol that allows a network storage-management application to control the backup and recovery of an NDMP-compliant file server, without installing vendor-acquired software on that file server.

network data-transfer rate
A rate that is calculated by dividing the total number of bytes that are transferred by the data transfer time. For example, this rate can be the time that is spent transferring data over a network.

node A file server or workstation on which the backup-archive client program has been installed, and which has been registered to the server.

node name
A unique name that is used to identify a workstation, file server, or PC to the server.

node privilege class
A privilege class that gives an administrator the authority to remotely access backup-archive clients for a specific client node or for all clients in a policy domain. See also *privilege class*.

non-native data format
A format of data that is written to a storage pool that differs from the format that the server uses for operations.

normal recall mode
A mode that causes a migrated file to be copied back to its originating file system when it is accessed.

O

offline volume backup
A backup in which the volume is locked so that no other system applications can access it during the backup operation.

online volume backup
A backup in which the volume is available to other system applications during the backup operation.

open registration
A registration process in which users can register their workstations as client nodes with the server. Contrast with *closed registration*.

operator privilege class
A privilege class that gives an administrator the authority to disable or halt the server, enable the server, cancel server processes, and manage removable media. See also *privilege class*.

options file
A file that contains processing options. On Windows and NetWare systems, the file is called dsm.opt. On AIX, UNIX, Linux, and Mac OS X systems, the file is called dsm.sys.

originating file system
The file system from which a file was

migrated. When a file is recalled using normal or migrate-on-close recall mode, it is always returned to its originating file system.

orphaned stub file
A file for which no migrated file can be found on the Tivoli Storage Manager server that the client node is contacting for space management services. For example, a stub file can be orphaned when the client system-options file is modified to contact a server that is different than the one to which the file was migrated.

out-of-space protection mode
A mode that controls whether the program intercepts out-of-space conditions. See also *execution mode*.

P

pacing
In SNA, a technique by which the receiving system controls the rate of transmission of the sending system to prevent overrun.

packet In data communication, a sequence of binary digits, including data and control signals, that is transmitted and switched as a composite whole.

page A defined unit of space on a storage medium or within a database volume.

partial-file recall mode
A recall mode that causes the hierarchical storage management (HSM) function to read just a portion of a migrated file from storage, as requested by the application accessing the file.

password generation
A process that creates and stores a new password in an encrypted password file when the old password expires. Automatic generation of a password prevents password prompting. Password generation can be set in the options file (`passwordaccess` option). See also *options file*.

path An object that defines a one-to-one relationship between a source and a destination. Using the path, the source accesses the destination. Data can flow from the source to the destination, and back. An example of a source is a data mover (such as a network-attached storage [NAS] file server), and an example of a destination is a tape drive.

pattern-matching character
See *wildcard character*.

physical file
A file that is stored in one or more storage pools, consisting of either a single logical file, or a group of logical files that are packaged together as an aggregate. See also *aggregate* and *logical file*.

physical occupancy
The amount of space that is used by physical files in a storage pool. This space includes the unused space that is created when logical files are deleted from aggregates. See also *physical file*, *logical file*, and *logical occupancy*.

plug-in
A self-contained software component that modifies (adds, or changes) the function in a particular system. When a plug-in is added to a system, the foundation of the original system remains intact.

policy domain
A grouping of policy users with one or more policy sets, which manage data or storage resources for the users. The users are client nodes that are associated with the policy domain.

policy privilege class
A privilege class that gives an administrator the authority to manage policy objects, register client nodes, and schedule client operations for client nodes. Authority can be restricted to certain policy domains. See also *privilege class*.

policy set
A group of rules in a policy domain. The rules specify how data or storage resources are automatically managed for client nodes in the policy domain. Rules can be contained in management classes. See also *active policy set* and *management class*.

premigrated file
A file that has been copied to Tivoli Storage Manager storage, but has not been replaced with a stub file on the local file system. An identical copy of the file resides both on the local file system and

in Tivoli Storage Manager storage. Premigrated files occur on UNIX and Linux file systems to which space management has been added. Contrast with *migrated file* and *resident file*.

premigrated files database
A database that contains information about each file that has been premigrated to Tivoli Storage Manager storage. The database is stored in a hidden directory named `.SpaceMan` in each file system to which space management has been added.

premigration
The process of copying files that are eligible for migration to Tivoli Storage Manager storage, but leaving the original file intact on the local file system.

premigration percentage
A space management setting that controls whether the next eligible candidates in a file system are premigrated following threshold or demand migration.

primary storage pool
A named set of volumes that the server uses to store backup versions of files, archive copies of files, and files migrated from client nodes. See also *destination* and *copy storage pool*.

privilege class
A level of authority that is granted to an administrator. The privilege class determines which administrative tasks the administrator can perform. See also *node privilege class*, *operator privilege class*, *policy privilege class*, *storage privilege class*, and *system privilege class*.

profile
A named group of configuration information that can be distributed from a configuration manager when a managed server subscribes. Configuration information can include registered administrator IDs, policies, client schedules, client option sets, administrative schedules, storage manager command scripts, server definitions, and server group definitions. See also *configuration manager* and *managed server*.

Q

quota (1) For HSM on AIX, UNIX, or Linux systems, the limit (in megabytes) on the amount of data that can be migrated and premigrated from a file system to server storage.

(2) For HSM on Windows systems, a user-defined limit to the space that is occupied by recalled files.

R

randomization
The process of distributing schedule start times for different clients within a specified percentage of the schedule's startup window.

raw logical volume
A portion of a physical volume that is comprised of unallocated blocks and has no journaled file system (JFS) definition. A logical volume is read/write accessible only through low-level I/O functions.

read-without-recall recall mode
A mode that causes hierarchical storage management (HSM) to read a migrated file from storage without storing it back on the local file system. The last piece of information read from the file is stored in a buffer in memory on the local file system. Contrast with *normal recall mode* and *migrate-on-close recall mode*.

rebind
To associate all backed-up versions of a file with a new management class name. For example, a file that has an active backup version is rebound when a later version of the file is backed up with a different management class association. See also *bind*.

recall In Tivoli Storage Manager, to copy a migrated file from server storage back to its originating file system using the space management client. See also *transparent recall*, *selective recall*, and *recall mode*.

recall mode
A mode that is assigned to a migrated file with the **dsmattr** command that determines how the file is processed when it is recalled. It determines whether the file is stored on the local file system, is migrated back to Tivoli Storage Manager storage when it is closed, or is read from Tivoli Storage Manager storage without storing it on the local file system.

receiver
A server repository that contains a log of server and client messages as events. For example, a receiver can be a file exit, a user exit, or the Tivoli Storage Manager server console and activity log. See also *event*.

reclamation
The process of consolidating the remaining data from many sequential-access volumes onto fewer, new sequential-access volumes.

reclamation threshold
The percentage of space that a sequential-access media volume must have before the server can reclaim the volume. Space becomes reclaimable when files are expired or are deleted.

reconciliation
The process of synchronizing a file system with the Tivoli Storage Manager server, and then removing old and obsolete objects from the Tivoli Storage Manager server.

recovery log
A log of updates that are about to be written to the database. The log can be used to recover from system and media failures. The recovery log consists of the active log (including the log mirror) and archive logs.

register
To define a client node or administrator ID that can access the server.

registry
A repository that contains access and configuration information for users, systems, and software.

remote
(1) Pertaining to a system, program, or device that is accessed through a communication line.

(2) For HSM products, pertaining to the origin of migrated files that are being moved.

resident file
On a Windows system, a complete file on a local file system that might also be a migrated file because a migrated copy can exist in Tivoli Storage Manager storage. On a UNIX or Linux system, a complete file on a local file system that has not been migrated or premigrated, or that has been recalled from Tivoli Storage Manager storage and modified. Contrast with *stub file* and *premigrated file*. See *migrated file*.

restore
To copy information from its backup location to the active storage location for use. For example, to copy information from server storage to a client workstation.

retention
The amount of time, in days, that inactive backed-up or archived files are kept in the storage pool before they are deleted. Copy group attributes and default retention grace periods for the domain define retention.

retrieve
To copy archived information from the storage pool to the workstation for use. The retrieve operation does not affect the archive version in the storage pool.

roll back
To remove changes that were made to database files since the last commit point.

root user
A system user who operates without restrictions. A root user has the special rights and privileges needed to perform administrative tasks.

S

SAN See *storage area network*.

schedule
A database record that describes client operations or administrative commands to be processed. See *administrative command schedule* and *client schedule*.

scheduling mode
The type of scheduling operation for the server and client node that supports two scheduling modes: client-polling and server-prompted.

scratch volume
A labeled volume that is either blank or contains no valid data, that is not defined, and that is available for use.

script A series of commands, combined in a file, that carry out a particular function when the file is run. Scripts are interpreted as

they are run. Contrast with *Tivoli Storage Manager command script*.

Secure Sockets Layer (SSL)
A security protocol that provides communication privacy. With SSL, client/server applications can communicate in a way that is designed to prevent eavesdropping, tampering, and message forgery.

selective backup
The process of backing up certain files or directories from a client domain. The files that are backed up are those that are not excluded in the include-exclude list. The files must meet the requirement for serialization in the backup copy group of the management class that is assigned to each file. Contrast with *incremental backup*.

selective migration
The process of copying user-selected files from a local file system to Tivoli Storage Manager storage and replacing the files with stub files on the local file system. Contrast with *threshold migration* and *demand migration*.

selective recall
The process of copying user-selected files from Tivoli Storage Manager storage to a local file system. Contrast with *transparent recall*.

serialization
The process of handling files that are modified during backup or archive processing. See *dynamic serialization*, *static serialization*, *shared static serialization*, and *shared dynamic serialization*.

server A software program or a computer that provides services to other software programs or other computers.

server options file
A file that contains settings that control various server operations. These settings affect such things as communications, devices, and performance.

server-prompted scheduling mode
A client/server communication technique where the server contacts the client node when tasks must be done. Contrast with *client-polling scheduling mode*.

server storage
The primary, copy, and active-data storage pools that are used by the server to store user files such as backup versions, archive copies, and files migrated from space manager client nodes (space-managed files). See also *active-data pool*, *primary storage pool*, *copy storage pool*, *storage pool volume*, and *volume*.

session
A logical or virtual connection between two stations, software programs, or devices on a network that allows the two elements to communicate and exchange data.

session resource usage
The amount of wait time, processor time, and space that is used or retrieved during a client session.

shared dynamic serialization
A value for serialization that specifies that a file must not be backed up or archived if it is being modified during the operation. Tivoli Storage Manager retries the backup or archive operation a number of times; if the file is being modified during each attempt, Tivoli Storage Manager will back up or archive the file on its last try. See also *serialization*. Contrast with *dynamic serialization*, *shared static serialization*, and *static serialization*.

shared library
A library device that is used by multiple storage manager servers.

shared static serialization
A copy-group serialization value that specifies that a file must not be modified during a backup or archive operation. Tivoli Storage Manager attempts to retry the operation a number of times. If the file is in use during each attempt, the file is not backed up or archived. See also *serialization*. Contrast with *dynamic serialization*, *shared dynamic serialization*, and *static serialization*.

snapshot
An image backup type that consists of a point-in-time view of a volume.

space-managed file
A file that is migrated from a client node by the space manager client. The space manager client recalls the file to the client node on demand.

space management
The process of keeping sufficient free storage space available on a local file system for new data by migrating files to server storage. Synonymous with *hierarchical storage management*.

space manager client
A program that runs on a UNIX or Linux system to manage free space on the local file system by migrating files to server storage. The program can recall the files either automatically or selectively. Also called *hierarchical storage management (HSM) client*.

space monitor daemon
A daemon that checks space usage on all file systems for which space management is active, and automatically starts threshold migration when space usage on a file system equals or exceeds its high threshold.

sparse file
A file that is created with a length greater than the data it contains, leaving empty spaces for the future addition of data.

special file
On AIX, UNIX, or Linux systems, a file that defines devices for the system, or temporary files that are created by processes. There are three basic types of special files: first-in, first-out (FIFO); block; and character.

SSL See *Secure Sockets Layer*.

stabilized file space
A file space that exists on the server but not on the client.

stanza A group of lines in a file that together have a common function or define a part of the system. Each stanza is identified by a name that occurs in the first line of the stanza. Depending on the type of file, a stanza is ended by the next occurrence of a stanza name in the file, or by an explicit end-of-stanza marker. A stanza can also be ended by the end of the file.

startup window
A time period during which a schedule must be initiated.

static serialization
A copy-group serialization value that specifies that a file must not be modified during a backup or archive operation. If the file is in use during the first attempt, the storage manager cannot back up or archive the file. See also *serialization*. Contrast with *dynamic serialization*, *shared dynamic serialization*, and *shared static serialization*.

storage agent
A program that enables the backup and restoration of client data directly to and from storage attached to a storage area network (SAN).

storage area network (SAN)
A dedicated storage network that is tailored to a specific environment, combining servers, systems, storage products, networking products, software, and services.

storage hierarchy
(1) A logical order of primary storage pools, as defined by an administrator. The order is typically based on the speed and capacity of the devices that the storage pools use. The storage hierarchy is defined by identifying the next storage pool in a storage pool definition. See also *storage pool*.

(2) An arrangement of storage devices with different speeds and capacities. The levels of the storage hierarchy include: main storage, such as memory and direct-access storage device (DASD) cache; primary storage (DASD containing user-accessible data); migration level 1 (DASD containing data in a space-saving format); and migration level 2 (tape cartridges containing data in a space-saving format).

storage pool
A named set of storage volumes that are the destination that is used to store client data. A storage pool contains backup versions, archive copies, and files that are migrated from space manager client nodes. A primary storage pool is backed up to a copy storage pool. See also *primary storage pool*, *copy storage pool*, and *active-data pool*.

storage pool volume
A volume that has been assigned to a storage pool. See also *volume*, *active-data pool*, *copy storage pool*, and *primary storage pool*.

storage privilege class
A privilege class that gives an administrator the authority to control how storage resources for the server are allocated and used, such as monitoring the database, the recovery log, and server storage. See also *privilege class*.

stub A shortcut on the Windows file system that is generated by the hierarchical storage management (HSM) client for a migrated file that allows transparent user access. A stub is the sparse file representation of a migrated file, with a reparse point attached.

stub file
A file that replaces the original file on a local file system when the file is migrated to storage. A stub file contains the information that is necessary to recall a migrated file from Tivoli Storage Manager storage. It also contains additional information that can be used to eliminate the need to recall a migrated file.

stub file size
The size of a file that replaces the original file on a local file system when the file is migrated to Tivoli Storage Manager storage. The size that is specified for stub files determines how much leader data can be stored in the stub file. The default for stub file size is the block size defined for a file system minus 1 byte.

subscription
In a Tivoli environment, the process of identifying the subscribers that the profiles are distributed to. For Tivoli Storage Manager, a subscription is the process by which a managed server receives configuration information associated with a particular profile on a configuration manager. See also *managed server*, *configuration manager*, and *profile*.

system privilege class
A privilege class that gives an administrator the authority to issue all server commands. See also *privilege class*.

Systems Network Architecture (SNA)
The description of the logical structure, formats, protocols, and operational sequences for transmitting information through and controlling the configuration and operation of networks.

T

tape library
A set of equipment and facilities that support an installation's tape environment. The tape library can include tape storage racks, mechanisms for automatic tape mounting, a set of tape drives, and a set of related tape volumes mounted on those drives.

tape volume prefix
The high-level-qualifier of the file name or the data set name in the standard tape label.

target node
A client node for which other client nodes (called agent nodes) have been granted proxy authority. The proxy authority allows the agent nodes to perform operations such as backup and restore on behalf of the target node, which owns the data.

TCA See *trusted communications agent*.

TCP/IP
See *Transmission Control Protocol/Internet Protocol*.

threshold migration
The process of moving files from a local file system to Tivoli Storage Manager storage based on the high and low thresholds that are defined for the file system. Contrast with *demand migration*, *selective migration*, and *migration job*.

throughput
In storage management, the total bytes in the workload, excluding overhead, that are backed up or restored, divided by elapsed time.

timeout
A time interval that is allotted for an event to occur or complete before operation is interrupted.

timestamp control mode
A mode that determines whether commands preserve the access time for a file or set it to the current time.

Tivoli Storage Manager command script
A sequence of Tivoli Storage Manager administrative commands that are stored in the database of the Tivoli Storage Manager server. The script can run from any interface to the server. The script can

include substitution for command parameters and conditional logic.

tombstone object
A small subset of attributes of a deleted object. The tombstone object is retained for a specified period, and at the end of the specified period, the tombstone object is permanently deleted.

Transmission Control Protocol/Internet Protocol (TCP/IP)
An industry-standard, nonproprietary set of communication protocols that provides reliable end-to-end connections between applications over interconnected networks of different types.

transparent recall
The process that is used to automatically recall a file to a workstation or file server when the file is accessed. See also *recall mode*. Contrast with *selective recall*.

trusted communications agent (TCA)
A program that handles the sign-on password protocol when clients use password generation.

U

UCS-2 A 2-byte (16-bit) encoding scheme based on ISO/IEC specification 10646-1. UCS-2 defines three levels of implementation: Level 1-No combining of encoded elements allowed; Level 2-Combining of encoded elements is allowed only for Thai, Indic, Hebrew, and Arabic; Level 3-Any combination of encoded elements are allowed.

UNC See *Universal Naming Convention name*.

Unicode
A character encoding standard that supports the interchange, processing, and display of text that is written in the common languages around the world, plus some classical and historical texts. The Unicode standard has a 16-bit character set defined by ISO 10646.

Unicode-enabled file space
Unicode file space names provide support for multilingual workstations without regard for the current locale.

Unicode transformation format 8
Unicode Transformation Format (UTF), 8-bit encoding form, which is designed for ease of use with existing ASCII-based systems. The CCSID value for data in UTF-8 format is 1208.

Universal Naming Convention (UNC) name
A name that is used to access a drive or directory containing files shared across a network. The UNC name includes the system name and a SharePoint name that represents the shared drive or directory.

Universally Unique Identifier (UUID)
The 128-bit numeric identifier that is used to ensure that two components do not have the same identifier.

UTF-8 See *Unicode transformation format 8*.

UUID See *Universally Unique Identifier*.

V

validate
To check a policy set for conditions that can cause problems if that policy set becomes the active policy set. For example, the validation process checks whether the policy set contains a default management class.

version
A backup copy of a file stored in server storage. The most recent backup copy of a file is the active version. Earlier copies of the same file are inactive versions. The number of versions retained by the server is determined by the copy group attributes in the management class.

virtual file space
A representation of a directory on a network-attached storage (NAS) file system as a path to that directory.

virtual volume
An archive file on a target server that represents a sequential media volume to a source server.

volume
A discrete unit of storage on disk, tape or other data recording medium that supports some form of identifier and parameter list, such as a volume label or input/output control. See also *scratch volume*, and *storage pool volume*.

volume history file
A file that contains information about volumes that have been used by the server for database backups and for export of administrator, node, policy, or

server data. The file also has information about sequential-access storage pool volumes that have been added, reused, or deleted. The information is a copy of volume information that is recorded in the server database.

Volume Shadow Copy Service
A set of Microsoft application-programming interfaces (APIs) that you can use to create shadow copy backups of volumes, exact copies of files, including all open files, and so on.

VSS See *Volume Shadow Copy Service*.

VSS Backup
A backup operation that uses Microsoft Volume Shadow Copy Service (VSS) technology. The backup operation produces an online snapshot (point-in-time consistent copy) of Microsoft Exchange data. This copy can be stored on local shadow volumes or on Tivoli Storage Manager server storage.

VSS Fast Restore
A function that uses a Microsoft Volume Shadow Copy Service (VSS) software provider to restore VSS Backups (IBM Data Protection for Microsoft Exchange database files and log files) that reside on local shadow volumes.

VSS Instant Restore
A volume-level hardware-assisted Microsoft Volume Shadow Copy Service (VSS) function where target volumes that contain the snapshot are copied back to the original source volumes.

VSS offloaded backup
A backup operation that uses a Microsoft Volume Shadow Copy Service (VSS) hardware provider (installed on an alternate system) to move IBM Data Protection for Microsoft Exchange data to the Tivoli Storage Manager server. This type of backup operation shifts the backup load from the production system to another system.

VSS Restore
A function that uses a Microsoft Volume Shadow Copy Service (VSS) software provider to restore VSS Backups (IBM Data Protection for Microsoft Exchange database files and log files) that reside on Tivoli Storage Manager server storage to their original location.

W

wildcard character
A special character such as an asterisk (*) or a question mark (?) that can be used to represent one or more characters. Any character or set of characters can replace the wildcard character.

workstation
A terminal or personal computer at which a user can run applications and that is usually connected to a mainframe or a network.

worldwide name
A 64-bit, unsigned name identifier that is unique.

workload partition (WPAR)
A partition within a single operating system instance.

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Product Number: 5608-W07
5641-A06
5724-X94

Printed in USA

SC27-4006-00