

IBM Tivoli Storage Manager for Mail
Version 6.3

*Data Protection for Microsoft Exchange
Server
Installation and User's Guide*



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Note

Before using this information and the product it supports, read the information in “Notices” on page 241.

This edition applies to Version 6.3 of IBM Tivoli Storage Manager for Mail: Data Protection for Microsoft Exchange Server (product number 5608-E06) and to all subsequent releases and modifications until otherwise indicated in new editions.

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Preface

The subject of this publication is Data Protection for Exchange, a component of the IBM® Tivoli® Storage Manager for Mail product.

Data Protection for Exchange performs online backups of Microsoft Exchange Server databases to Tivoli Storage Manager storage. This integration with the Microsoft Exchange Server application program interface (API) maximizes the protection of data, thus providing a comprehensive storage management solution.

Tivoli Storage Manager is a client-server licensed product that provides storage management services in a multi-platform computer environment.

Throughout this document, the term *Windows* (unless otherwise specified) refers to the following operating systems:

- Windows Server 2003 (x64)
- Windows Server 2003 R2 (x64)
- Windows Server 2008 (x64)
- Windows Server 2008 R2 (x64)

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 *Windows VSS System Provider* (unless otherwise specified) refers to the standard Windows System provider.

Who should read this publication

This publication is intended for system installers, system users, Tivoli Storage Manager administrators, and system administrators.

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

- Microsoft Exchange Server
- Tivoli Storage Manager server
- Tivoli Storage Manager Backup-Archive Client
- Tivoli Storage Manager Application Program Interface
- Microsoft Volume Shadow Copy Service (VSS) technology (knowledge of this application is only assumed if you plan to perform VSS operations)

It is also assumed that you have an understanding of the following operating systems if you are using them:

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

It is also assumed that you have an understanding of the following IBM storage system used for the database:

- IBM System Storage® Disk Storage Models DS3000, DS4000®, DS5000
- IBM System Storage SAN Volume Controller (SVC)
- IBM Storwize® V7000 Disk System
- IBM XIV® Storage System Model 2810 (Gen2)
- IBM System Storage DS8000™ (DS8100, DS8300, or DS8700)
- Any storage devices that implements the VSS provider interface as defined in the VSS Provider Requirements section of this document

Product documentation formats

Data Protection for Exchange provides product documentation in these formats.

Installation and User's Guide

The *IBM Tivoli Storage Manager for Mail Data Protection for Microsoft Exchange Server Installation and User's Guide 6.3* provides detailed information regarding how to install, configure, and use Data Protection for Exchange 6.3 in a Windows server platform. This publication is provided in the following location in PDF and XHTML format:

- Online at the Tivoli Information Center: <http://publib.boulder.ibm.com/infocenter/tsminfo/v6r3/index.jsp>

GUI online help

GUI online help is provided for specific information related to tasks that are performed in the Data Protection for Exchange GUI. After launching the GUI, click on the **Help** menu item on the menu bar, and select **Help Topics**. The online help opens in a separate window.

Command-line help

Command-line help is also provided for specific information related to tasks that are performed on the Data Protection for Exchange command line. Enter `tdpexcc help` on the Data Protection for Exchange command-line interface for a list of available help topics. See “Help command” on page 219 for additional information.

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 Manager publications

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

Table 1. Tivoli Storage Manager server publications

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

Table 2. Tivoli Storage Manager storage agent publications

Publication title	Order number
<i>IBM Tivoli Storage Manager for SAN for AIX Storage Agent User's Guide</i>	SC23-9797
<i>IBM Tivoli Storage Manager for SAN for HP-UX Storage Agent User's Guide</i>	SC23-9798
<i>IBM Tivoli Storage Manager for SAN for Linux Storage Agent User's Guide</i>	SC23-9799

Table 2. Tivoli Storage Manager storage agent publications (continued)

Publication title	Order number
<i>IBM Tivoli Storage Manager for SAN for Oracle Solaris Storage Agent User's Guide</i>	SC23-9800
<i>IBM Tivoli Storage Manager for SAN for Windows Storage Agent User's Guide</i>	SC23-9553

Table 3. Tivoli Storage Manager client publications

Publication title	Order number
<i>IBM Tivoli Storage Manager for UNIX and Linux: Backup-Archive Clients Installation and User's Guide</i>	SC23-9791
<i>IBM Tivoli Storage Manager for Windows: Backup-Archive Clients Installation and User's Guide</i>	SC23-9792
<i>IBM Tivoli Storage Manager Using the Application Programming Interface</i>	SC23-9793
<i>IBM Tivoli Storage Manager for Space Management for UNIX and Linux: User's Guide</i>	SC23-9794
<i>IBM Tivoli Storage Manager HSM for Windows Administration Guide</i>	SC23-9795

Table 4. Tivoli Storage Manager data protection publications

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

Table 5. IBM Tivoli Storage Manager troubleshooting and tuning publications

Publication title	Order number
<i>IBM Tivoli Storage Manager Problem Determination Guide</i>	GC23-9789
<i>IBM Tivoli Storage Manager Performance Tuning Guide</i>	GC23-9788
<i>IBM Tivoli Storage Manager Client Messages and Application Programming Interface Return Codes</i>	SC27-2878

Table 5. IBM Tivoli Storage Manager troubleshooting and tuning publications (continued)

Publication title	Order number
<i>IBM Tivoli Storage Manager Server Messages and Error Codes</i>	SC27-2877
<i>IBM Tivoli Storage Manager for Mail: Data Protection for Microsoft Exchange Server Messages</i>	GC27-4011
<i>IBM Tivoli Storage Manager for Databases: Data Protection for Microsoft SQL Server Messages</i>	GC27-4012
<i>IBM Tivoli Storage Manager for Databases: Data Protection for Oracle Messages</i>	SC27-4014
<i>IBM Tivoli Storage Manager for Mail: Data Protection for Lotus Domino Messages</i>	SC27-4015
<i>IBM Tivoli Storage Manager for Enterprise Resource Planning: Data Protection for SAP Messages</i>	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.

Tivoli Storage FlashCopy Manager publications

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

Table 6. Tivoli Storage FlashCopy Manager publications

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

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](https://www.ibm.com/developerworks/mydeveloperworks/wikis/home/wiki/Tivoli%20Storage%20FlashCopy%20Manager)

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_\(general\)](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



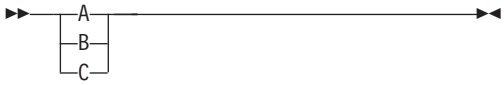




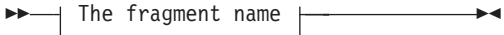

This section describes how to read the syntax diagrams that are used in this publication. To read a syntax diagram, follow the path of the line. Read from left to right, and top to bottom.

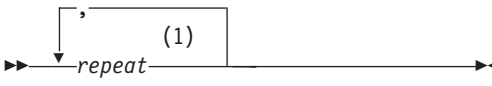
- The ►— symbol indicates the beginning of a syntax diagram.
- The —► symbol at the end of a line indicates the syntax diagram continues on the next line.
- The ►— symbol at the beginning of a line indicates a syntax diagram continues from the previous line.
- The —►◀ symbol indicates the end of a syntax 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.	►—KEYWOrd—►◀																						
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.	<table><tr><td>*</td><td>Asterisk</td></tr><tr><td>{ }</td><td>Braces</td></tr><tr><td>:</td><td>Colon</td></tr><tr><td>,</td><td>Comma</td></tr><tr><td>=</td><td>Equal Sign</td></tr><tr><td>-</td><td>Hyphen</td></tr><tr><td>()</td><td>Parentheses</td></tr><tr><td>.</td><td>Period</td></tr><tr><td>'</td><td>Single quotation mark</td></tr><tr><td></td><td>Space</td></tr><tr><td>"</td><td>Quotation mark</td></tr></table>	*	Asterisk	{ }	Braces	:	Colon	,	Comma	=	Equal Sign	-	Hyphen	()	Parentheses	.	Period	'	Single quotation mark		Space	"	Quotation mark
*	Asterisk																						
{ }	Braces																						
:	Colon																						
,	Comma																						
=	Equal Sign																						
-	Hyphen																						
()	Parentheses																						
.	Period																						
'	Single quotation mark																						
	Space																						
"	Quotation mark																						
Variables:																							
Italicized lowercase items (<i>var_name</i>) denote variables.	►—KEYWOrd— <i>var_name</i> —►◀																						
In this example, you can specify a <i>var_name</i> 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 <i>must</i> specify one item. In this example, you <i>must</i> 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
<p>Footnote:</p> <p>A footnote in the diagram references specific details about the syntax containing the footnote.</p> <p>In this example, the footnote by the arrow references the number of times you can repeat the item.</p>	 <p>Notes:</p> <p>1 Specify <i>repeat</i> as many as 5 times.</p>

Data Protection for Microsoft Exchange Server updates

The following features are new for Data Protection for Exchange Version 6.3:

New MMC GUI

A new MMC GUI that enhances the user experience of Data Protection for Exchange is available. The following features are available in the new MMC GUI:

- Interactive individual mailbox restore functionality
- A new backup and restore interface with MMC GUI integration
- Added filtering and refresh options
- A new Task Manager to process query, backup, and restore operations as individual tasks. Multiple tasks can be submitted simultaneously.
- New configuration wizards to assist with setting up Data Protection for Exchange
- A new integrated interface for configuration properties
- New dashboard views that provide graphical views of Data Protection for Exchange activities
- New 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.

Restore VSS backups to flat files

Use the **restorefiles** command to restore VSS backups to flat files without involving the Exchange Server.

Enhanced Statistics

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

Chapter 1. Protection for Microsoft Exchange server databases

IBM Tivoli Storage Manager for Mail: Data Protection for Microsoft Exchange Server provides online backups and restores of Microsoft Exchange Server components to Tivoli Storage Manager storage. Data Protection for Microsoft Exchange Server provides a connection between an Exchange Server and a Tivoli Storage Manager server which allows Exchange data to be protected and managed by Tivoli Storage Manager. Data Protection for Microsoft Exchange Server protects Exchange server data and improves the availability of Exchange databases.

Data Protection for Microsoft Exchange Server provides these features and functions.

Data Protection for Exchange overview

This section provides introductory information about Data Protection for Exchange.

Data Protection for Exchange performs online backups and restores of Microsoft Exchange Server storage groups (Exchange Server 2007) or databases (Exchange Server 2010) to Tivoli Storage Manager storage or local shadow volumes. You can perform backups and restores using a command-line or graphical user interface (GUI) on Windows Server 2003, Windows Server 2003 R2, Windows Server 2008, and Windows Server 2008 R2. Refer to your Exchange Server documentation for complete, detailed information regarding the backup and restore of Microsoft Exchange Servers.

Microsoft does not support the Microsoft Legacy API (streaming) for backups starting with Exchange Server 2010, it does support the use of VSS for backups.

Data Protection for Exchange operations use the Tivoli Storage Manager application programming interface (API) to communicate with the Tivoli Storage Manager server, and use the Exchange API to communicate with Exchange Server. In addition to using these APIs, Data Protection for Exchange VSS operations use the Tivoli Storage Manager backup-archive client and Microsoft Volume Shadow Copy Service technology to produce an online snapshot (point-in-time consistent copy) of Exchange data that can be stored on local shadow volumes or on Tivoli Storage Manager server storage.

You must install Data Protection for Exchange on the same machine as the Exchange Server. Data Protection for Exchange must be able to connect to a Tivoli Storage Manager server running on any supported operating system. See “Software and operating system requirements” on page 53 for the required level of Tivoli Storage Manager server. Optionally, the Tivoli Storage Manager server can be on the same machine as the Exchange Server, but this is not recommended. Data Protection for Exchange also supports operations in a Microsoft Windows Failover Clustering (previously MSCS) or Veritas Cluster Server (VCS) environment.

Data Protection for Exchange product features

Data Protection for Exchange helps protect and manage Exchange Server environments by facilitating the backup, restore, and recovery of Exchange Server data.

Data Protection for Exchange provides the following key features:

Table 7. Data Protection for Exchange key features

Feature	Referred to as:	More information:
Perform individual mailbox recovery and item-level recovery from Data Protection for Exchange backups	Mailbox restore	"Restoring individual mailbox and mailbox item-level data" on page 98
Back up Exchange Server 2007 databases using the Exchange server streaming backup and restore API	Legacy backup	"Legacy backup processing: Overview" on page 3
Back up Exchange Server databases using Microsoft Volume Shadow Copy Service (VSS)	VSS Backup	"VSS Backup" on page 8
Back up Exchange Server 2007 continuous replica copies (CCR or LCR) using VSS technology	Backup from replica	"Replication on Exchange Server 2007" on page 11
Back up Exchange Server 2010 Database Availability Group (DAG) databases	Backup from replica	"Replication on Exchange Server 2010" on page 12
Perform a VSS Backup to the Tivoli Storage Manager server using an alternate machine instead of a production machine	Offloaded Backup	"Offloaded VSS Backup" on page 11
Restore VSS Backups that reside on Tivoli Storage Manager server storage to their original location	VSS Restore	"VSS Restore" on page 16
Restore VSS Backups that reside on local shadow volumes using file-level copy mechanisms	VSS Fast Restore	"VSS Fast Restore" on page 17
Restore VSS Backups that reside on local shadow volumes using hardware-assisted volume-level copy mechanisms	VSS Instant Restore	"VSS Instant Restore" on page 17
Restore a VSS Backup of Exchange Server 2007 data into a Recovery Storage Group, alternate storage group, or relocated storage group	Restore into	"Restoring VSS Backups into alternate locations" on page 26
Restore a VSS Backup of Exchange Server 2010 data into a Recovery database, alternate database, or relocated database	Restore into	"Restoring VSS Backups into alternate locations" on page 26
Query the managed capacity for VSS backups that reside on local shadow volumes	query managedcapacity command	"Query Managedcapacity command" on page 140
Delete a VSS Backup of an Exchange Server storage group or database	delete backup command	"Delete Backup command" on page 205
Manage policy for VSS backups that reside on local shadow volumes	policy commands	"Query Policy command" on page 225
Integrate with Tivoli Storage FlashCopy Manager	Advanced VSS support	"Transitioning Exchange Server backups from Tivoli Storage FlashCopy Manager to Tivoli Storage Manager" on page 227
Tivoli Storage Manager policy-based management of VSS snapshot backups	Server policy	"How Tivoli Storage Manager server policy affects Data Protection for Exchange" on page 29
Use the restorefiles command to restore VSS backups to flat files without involving the Exchange Server.	restorefiles command	"Restorefiles command" on page 177

Table 7. Data Protection for Exchange key features (continued)

Feature	Referred to as:	More information:
Requirement: Tivoli Storage FlashCopy Manager version 3.1 or later is required to use Offloaded backups, VSS Fast Restore, VSS Instant restore, and query managedcapacity.		

The term *local shadow volumes* is used throughout this document to describe data that is stored on shadow volumes localized to a disk storage subsystem.

Exchange Server 2010: Features overview

Certain Data Protection for Exchange 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. They provide continuous replication and continuous mailbox availability (replaces Exchange Server 2007 LCR, CCR, and SCR replication).
- Exchange databases replace Exchange storage groups.
- Exchange Management Shell commands have been changed to support the new Exchange features and storage configuration.
- 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.
- Only VSS-style backups are supported. Legacy-style backups are not supported with Exchange Server 2010.

Legacy backup processing: Overview

A backup performed by Data Protection for Exchange creates a copy of an Exchange Server 2007 storage group on Tivoli Storage Manager server storage. The backup includes any associated transaction logs.

Legacy backups, also referred to as traditional "streaming" backups, are not supported for Exchange Server 2010 databases. Instead, VSS Backups are available.

Tip: Data Protection for Exchange tracks and stores mailbox location history, which is used to automate mailbox restore operations. This causes a delay before each backup. If you do not plan to use mailbox restore, you can safely disable mailbox history.

Note: Use the INCLUDE statements in the Data Protection for Exchange options file to specify a TSM management class for the mailbox history backup. A backup copy group is needed in the mailbox history management class "Specifying Data Protection for Exchange options" on page 47.

When a Legacy backup operation is initiated, Data Protection for Exchange performs the following actions:

1. Begins a session with a Tivoli Storage Manager server.
2. Informs the Exchange Server that a backup is ready to begin.

3. Forwards data from the Exchange Server to the Tivoli Storage Manager server.
4. Informs the Exchange Server that the backup is complete.
5. Ends the Tivoli Storage Manager server session.

Data Protection for Exchange provides backup and restore functions for the Exchange storage groups and associated transaction logs. Data Protection for Exchange does not provide a complete disaster recovery solution for an Exchange Server. In a disaster recovery situation, Data Protection for Exchange only restores storage groups. Other files need to be restored in a disaster recovery situation. Refer to your Microsoft Exchange Server documentation for disaster recovery considerations.

Personal folders and personal address books that are stored on Microsoft Outlook clients are not protected by Data Protection for Exchange. The Tivoli Storage Manager Backup-Archive client can be used on the Outlook client platform to back up and restore these files. Because the Outlook client normally keeps these files locked when running, you should stop the Outlook client before backing up or restoring these files. Because Tivoli Storage Manager Backup-Archive client provides open file support, you might be able to back up and restore these files while the Outlook client is running.

VSS Backup processing: Overview

Data Protection for Exchange VSS Backup operations are implemented through the Tivoli Storage Manager backup-archive client.

The Tivoli Storage Manager backup-archive client serves as the VSS Requestor that communicates with VSS to access the Exchange data to create shadow copies of Exchange storage groups. The Data Protection for Exchange serves as a front end for VSS Backup operations and performs the following actions when a VSS Backup operation is initiated:

1. Data Protection for Exchange validates the state of Exchange server objects.
2. It begins a session with a Tivoli Storage Manager server.
3. It verifies that the VSS service is running and that the Exchange writer is available.
4. The Tivoli Storage Manager VSS Requestor lists the backup components through the VSS Writer.
5. The Tivoli Storage Manager VSS Requestor performs the VSS snapshot backup preparation stage.
6. The Tivoli Storage Manager VSS Requestor performs the actual VSS Backup.
7. The Tivoli Storage Manager VSS Requestor performs an integrity check on the VSS Backup.
8. Optionally, the integrity check can be offloaded to an alternative machine that has the Tivoli Storage Manager VSS Requestor installed and configured.
9. The Tivoli Storage Manager VSS Requestor backs up the data (and metadata) to a Tivoli Storage Manager server. Optionally, the movement of data to a Tivoli Storage Manager server can be offloaded to an alternate machine that has the Tivoli Storage Manager VSS Requestor installed and configured.
10. The Tivoli Storage Manager VSS Requestor marks the backup as complete in VSS.
11. Data Protection for Exchange ends the Tivoli Storage Manager server session.

Because of the role that the backup-archive client performs as the VSS Requester, features such as LAN-free backup, client-side deduplication, database encryption, and data compression require that options related to these features be specified in the backup-archive client options file (and not the Data Protection for Exchange options file) for VSS operations. The *IBM Tivoli Storage Manager for Copy Services Microsoft Exchange VSS Integration Module* or Tivoli Storage FlashCopy Manager enables the backup-archive client to serve as the VSS Requestor.

Use the INCLUDE statements in the Data Protection for Exchange options file to specify a TSM management class for the mailbox history backup. A backup copy group is needed in the mailbox history management class "Specifying Data Protection for Exchange options" on page 47.

VSS Service

The VSS Service manages and directs VSS software applications.

These are the VSS software applications that the VSS Service manages and directs:

VSS writer

The VSS writer is the Microsoft Exchange Server. It is installed with the Exchange Server software and requires no configuration.

VSS requester

The VSS requestor is the Tivoli Storage Manager backup-archive client.

VSS provider

The VSS provider manages the volumes where the Exchange data resides. Configuration requirements are based upon the type of VSS provider used in your environment. For example:

- If you are using the Windows VSS System Provider, no configuration is required.
- If your Exchange storage is configured on a disk storage subsystem and you want to leverage the hardware to manage the snapshots, you must install a VSS hardware provider.
- If you plan to perform VSS Instant Restores, be aware that XIV, IBM System Storage SAN Volume Controller, Storwize V7000, DS6000™, and DS8000® are the only storage subsystems that support VSS Instant Restores and require a VSS provider. Therefore, you *must* install and configure the following components as your hardware providers to perform VSS Instant Restores:
 - For XIV: IBM XIV Provider for Microsoft Windows Volume Shadow Copy Service
 - For SAN Volume Controller, Storwize V7000, DS6000, and DS8000: IBM System Storage Support for Microsoft Virtual Disk and Volume Shadow Copy Services (referred to as "VSS hardware provider" throughout the remainder of this document)

VSS provider support and documentation for IBM System Storage disk storage subsystems is available at the following Web site:

http://www-01.ibm.com/support/docview.wss?rs=1114&context=HW2C2&dc=D400&q1=ssg1*&uid=ssg1S4000372

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

For more information about IBM XIV Provider for Microsoft Windows Volume Shadow Copy Service see, http://publib.boulder.ibm.com/infocenter/ibmxiv/r2/index.jsp?topic=%2Fcom.ibm.help.xiv.doc%2Fxiv_provider_for_ms_vss.html.

For more information about VSS technology, see the Microsoft Technical Reference document "How Volume Shadow Copy Service Works" at the following Web site: <http://technet2.microsoft.com/windowsserver/en/library/2b0d2457-b7d8-42c3-b6c9-59c145b7765f1033.mspx?mfr=true>

Backup types

Data Protection for Exchange provides five types of backup. The full backup, copy backup, incremental backup, and differential backup types can be performed with legacy (Exchange Server 2007 only) and VSS operations. The database copy backup type, **DBCOPY**, can be performed with legacy operations on Exchange Server 2007 only.

Data Protection for Exchange backup types have the following characteristics:

Full Backup (Legacy and VSS)

A full backup backs up the specified storage group or database, as well as associated transaction logs. The Exchange Server deletes the committed log files after the storage group or database, and logs are *successfully* checked for integrity and backed up. If the storage group or database is not mounted, the backup will fail and the transaction logs will not be truncated.

Incremental Backup (Legacy and VSS)

An incremental backup backs up only transaction logs. The Exchange Server deletes the committed log files after they are *successfully* backed up. These log files are not deleted if the backup fails. Restoration of an Exchange Server storage group or database from an incremental backup requires the following tasks:

- Restore of the last full backup
- Restore of any other incremental backups performed between the full backup and this incremental backup
- Restore of this incremental backup

The log files are *not* deleted if storage groups or databases are not mounted.

Differential Backup (Legacy and VSS)

A differential backup only backs up transaction logs, but does not delete them. If you perform a full backup, and then perform only differential backups, the last full backup plus the latest differential backup has all data needed to bring the storage group back to the most recent state. This type of backup is also called a *cumulative incremental* backup.

Restoring an Exchange Server storage group from a differential backup requires the following tasks:

- Restore of the last full backup
- Restore of *this* differential backup, but *no other* differential backups

Copy Backup (Legacy and VSS)

A copy backup is similar to a full backup except that transaction log files are not deleted after the backup. A copy backup is used to make a full backup of the Exchange Server storage group without disrupting any backup procedures that use incremental or differential backups.

Database Copy Backup (Legacy only)

A database copy backup backs up *only the specified database* as well as its associated transaction logs. The transaction log files are not deleted after

the backup. A database copy backup is used to make a special full backup of the database without disrupting any backup procedures that use incremental or differential backups.

Restriction: When circular logging is enabled, you cannot use differential or incremental backups. This is because data loss might occur if the log wrapped before an incremental or differential backup is done. If you choose a backup strategy that involves incremental or differential backups, you must disable circular logging for the Exchange storage group or database from the Exchange Administrator program. See your Microsoft Exchange Server documentation for more information on circular logging.

Backup methods

Data Protection for Exchange provides a Legacy method (Exchange 2007) and a VSS method for backing up data.

Legacy Backup

A legacy backup is a specialized API backup that functions with the Exchange server storage engine. It is occasionally referred to as the Exchange-server streaming backup and restore API.

The following characteristics are true of Legacy backups:

- You can use full, copy, incremental, differential, and database copy backup types.
- Backup granularity is at the database and storage-group level.
- Backups are stored on Tivoli Storage Manager server storage.
- Backups are managed through the Tivoli Storage Manager server policy.
- Backups can be performed in a Microsoft Windows Failover Clustering (previously MSCS) or Veritas Cluster Server (VCS) environments.
- Backups provide Exchange Server database zeroing function.
- Backups provide Exchange Server database integrity check function.
- Exchange Server 2010 does not support Legacy backups.

The following restrictions apply:

- Microsoft does not support legacy backups on cluster continuous replication (CCR) or local continuous replication (LCR).
- Microsoft does not support performing legacy (or VSS) backups on standby continuous replication (SCR) databases. You cannot run legacy backups on CCR, LCR, or SCR databases.
- You can run VSS Backups on CCR and LCR databases.
- You can use legacy backups to backup databases that have CCR, LCR, or SCR replicas, but you must backup the primary database, not the replica.

VSS Backup

A VSS Backup uses Microsoft Volume Shadow Copy Service technology to produce an online snapshot (point-in-time consistent copy) of Exchange data that can be stored on local shadow volumes or on Tivoli Storage Manager server storage. Both of these storage destinations require that sufficient space be available for the snapshot.

A VSS Backup means the Exchange 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. In addition, a VSS Backup allows a snapshot of large amounts of data at one time since the snapshot works at the volume level.

Optionally, VSS Backups can be stored locally on VSS shadow volumes that are directly accessible by the Exchange system, as long as sufficient space is available for the snapshot. These types of backups are fast because data is not placed into Tivoli Storage Manager server storage. Restoring these backups is also fast because the Exchange data is not transferred from Tivoli Storage Manager server storage over the network.

When performing VSS Backups and moving data to Tivoli Storage Manager server storage, sufficient space on local snapshot volumes is still required to hold the snapshot. For Exchange data backed up to Tivoli Storage Manager server storage, the Exchange data on the snapshot volume is sent to the Tivoli Storage Manager server. When the data transfer to the server is complete, the snapshot volume is made available for reuse. If you are storing VSS Backups locally and the maximum number of local backup versions to be maintained (as specified by the Tivoli Storage Manager policy) is reached, the oldest backup version is expired in order to create the snapshot for the backup to Tivoli Storage Manager server storage. See "How Tivoli Storage Manager server policy affects Data Protection for Exchange" on page 29 for details regarding how Tivoli Storage Manager proceeds in this situation.

For Exchange data backed up to local shadow volumes, the snapshot backup resides on the shadow copy volume.

For Exchange data backed up to both destinations, a local snapshot backup is performed and the Exchange data on the local snapshot volume is sent to the Tivoli Storage Manager server. The local snapshot volume is retained as a local backup.

VSS Backup characteristics

Some VSS Backup characteristics are different from Legacy backup characteristics. Examples of these differences are the backup characteristics for types supported, the backup granularity, and the backup storage location options.

The following characteristics are true of VSS Backup:

- Full, copy, incremental, and differential backup types are supported. Database copy backup types are not supported.
- Backup granularity is at the storage group or database level only.
- Backups are managed through Tivoli Storage Manager server policy.
- Backups can be stored on local shadow volumes, Tivoli Storage Manager server storage, or both locations.
- Different policy settings can be defined for each storage location and backup method.

- Backups to Tivoli Storage Manager server storage can be offloaded to an alternate machine as resource relief for production servers.
- Backups can be run in a Microsoft Windows Failover Clustering (previously MSCS) or Veritas Cluster Server (VCS) environments.
- Backups do not provide an Exchange Server database zeroing function.
- Backups provide an Exchange Server database integrity check function.
- Back up regular storage groups and databases and restore them to the Recovery Storage Group or Recovery Database, or to an alternative location.
- VSS backups can be restored to flat files without the involvement of the Exchange Server. See the **restorefiles** command for more details.
- Backup and restore functions into a Recovery Database are supported on Exchange Server 2010.
- There is no automatic retry for Data Protection for Exchange VSS operations like there is for legacy operations.
- VSS is the only available backup method on Exchange Server 2010.
- For databases in an Exchange Server 2010 DAG that have two or more healthy copies, the database integrity check can be skipped.

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:

- When running VSS operations, make sure you have at least 200 megabytes of free disk space on your Windows System Drive. This space is used to hold the metadata files for Data Protection for Exchange.
- Make sure to 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.
- If you are using Exchange Server 2007, consider using Exchange Server LCR, CCR, or SCR replication technology to help protect your Exchange Server and possibly reduce the frequency of backup operations. Single Copy Cluster (SCC) local backups can be restored to other nodes in the cluster. Cluster Continuous Replication (CCR) local backups can only be restored to the node that performed the backup. Refer to your Microsoft documentation for details regarding this technology.
- If you are using Exchange Server 2010, consider using DAG database replication technologies. Refer to your Microsoft documentation for details regarding this technology.
- Make sure you have a well-defined and tested recovery plan that meets your service level objectives.
- Use single hardware LUNs for log and system files.
- Use single hardware LUNs for the database files.
- Use basic disks.
- If you plan to keep some VSS snapshot backups on local shadow volumes only, make sure to 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 Data Protection for Exchange, make sure to consult your VSS provider documentation for a complete understanding of your VSS implementation.

- If you schedule parallel VSS Backups, ensure that snapshots of the same volume do not occur at the same time. This will cause operations to fail.
- 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 Data Protection for Microsoft Exchange Server. Setting ASNODENAME can cause VSS backups and VSS restores to fail.

System Provider:

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

Be aware that if you are using the Windows VSS System Provider, no configuration is required. However, you can make some configuration changes using the VSSADMIN commands. See Microsoft documentation on the VSSADMIN commands for details.

Software or Hardware Provider:

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

If you use a software or hardware provider, consider the following requirements when planning for VSS Backups:

- Place database files on a separate and dedicated logical volume.
- Place logs for each database on a separate logical volume.
- Do not place non-Exchange data on storage volumes that are dedicated to Exchange.
- When using hardware snapshot providers, do not share storage group LUNs with other storage groups or applications.
- Make sure to read and follow specific installation and configuration instructions in the documentation provided by your VSS provider vendor.

In addition, if a hardware provider is used, it is recommended that the disks that contain Exchange data be configured as basic.

XIV, DS6000, DS8000, SAN Volume Controller, and Storwize V7000 requirements:

These storage subsystems require specific database, log, file, and LUN settings.

When using any of these storage subsystems, consider the following requirements when planning for VSS Backups:

- Place database files on a separate and dedicated logical volume.
- Place logs on a separate logical volume.

- Do not place non-Exchange data on storage volumes that are dedicated to Exchange.
- When using hardware snapshot providers, do not share storage group LUNs with other storage groups or applications.
- (SAN Volume Controller and Storwize V7000 only) If you use multiple target FlashCopy mappings, a mapping can stay in the copying state after all the source data is copied to the target. This situation can occur if mappings that were started earlier and use the same source disk are not yet fully copied. Because of this, you should initiate local backups for SAN Volume Controller and Storwize V7000 storage subsystems at intervals greater than the time required for the background copy process to complete.
- (DS8000 only): In order to use incremental FlashCopy, the following two applications are also required for DS8000:
 - 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)

Note: You cannot restore from multiple Space-Efficient targets on DS8000.

Offloaded VSS Backup

An offloaded backup uses another machine for running the integrity check and moving the data to the Tivoli Storage Manager server.

This type of backup shifts the backup load from the production machine to another machine. This frees the production system to serve the Exchange server. This requires that a VSS hardware provider that supports transportable shadow copy volumes is installed on the production and secondary machines.

Offloaded VSS backups require a Tivoli Storage FlashCopy Manager license.

Continuous replication backups

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. Single Copy Cluster (SCC) local backups can be restored to other nodes in the cluster. Cluster Continuous Replication (CCR) local backups can only be restored to the node that performed the backup.
- 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

Make sure to 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* option in the GUI Backup tab or specify the *lfromreplica* 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. In addition, 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 using the Legacy or VSS Backup method.

When running in aVSS Instant Restore CCR environment, stop the Microsoft Exchange Replication Service on both the active node and the passive node before running the restore operation. CCR local backups can only be restored to the node that performed the backup.

Microsoft does not support VSS (or Legacy) 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.

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.

Data Protection for Exchange 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 Data Protection for Exchange with Exchange Server 2010 DAGs:

- Backups from active and passive copies are managed separately.
- Backups for a given database should be run from the same Exchange server, if possible. Backups performed from different Exchange servers are managed separately.
- You cannot create incremental or differential backups from different Exchange servers.
- Restores must be run on an active database.

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, to avoid having to restore from an alternate 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.
- Use the command-line backup options `/EXCLUDEDAGPASSIVE`, `/EXCLUDEDAGACTIVE`, or `/EXCLUDENONDAGDBS` to exclude certain databases from backup processing. See “Backup optional parameters” on page 153 for details about these processing options.
- For databases in a DAG that have two or more healthy copies, the database integrity check can be skipped, see: <http://msdn.microsoft.com/en-us/library/dd877010%28v=exchg.140%29.aspx>.

Database Availability Group restore best practices

The following list details the recommended best practices for restore operations:

- Run backups for replicated database copies from the same Exchange Server, to avoid having to restore from an alternate server.
- Run backups on the passive database copies, so as not to increase the load on the production Exchange server.
- Run restores to the active database copy.
- The restore operation must be run on the node where the backup was created.
- If the backup was created on a passive copy, make the copy active before performing the restore.
- When the restore is complete, you can move the active database copy back to the passive state.
- For recovering DAG database backups to alternate Exchange servers, follow the specialized steps that are documented in “Restoring VSS Backups into alternate locations” on page 26.

For detailed instructions on performing a recovery of a DAG database, see “Restoring a Database Availability Group database copy” on page 105.

Restore processing: Overview

A restore obtains backup copies of Exchange storage groups and transaction logs and returns them to the Exchange Server.

Restore of a Legacy backup is not available for Exchange Server 2010 databases. Instead, restore of VSS backups is available.

Restore processing: Actions

Attention: To perform restore processing, Data Protection for Exchange requires that the Exchange Information Store service must be running, but the databases being restored within the storage group must be dismounted.

When a Legacy restore operation is initiated, Data Protection for Exchange performs the following actions:

1. Prompts the user to dismount the databases or cancel the restore operation entirely. This prompt occurs in the GUI only. Command-line interface users must dismount necessary databases prior to issuing the restore command.
2. Starts a session with a Tivoli Storage Manager server.
3. Informs the Exchange Server that a restore is about to begin.
4. Restores the specified storage group(s) and logs from the Tivoli Storage Manager server. The logs are restored to a temporary location as specified by the user.

When performing a Legacy restore of a mailbox database, if a Recovery Storage Group exists, mailbox database will automatically be restored to the Recovery Storage instead of to the original storage group. When restoring a mailbox database to a Recovery Storage Group, you can specify the option to replay restored logs only or to replay restored and current logs. Select **Show Restore Options** in the GUI Restore tab to set these options. This note only applies to Legacy restores. VSS Restores into the Recovery Storage Group are supported by Microsoft with Exchange Server.

5. Informs the Exchange Server that the restore has completed. At this point you have the option of:
 - Starting recovery
 - Mounting the databases (when recovery completes)
6. Ends the Tivoli Storage Manager server session.

Depending on the backup strategy you choose, restoring an Exchange storage group can involve restoring multiple backup objects from the Tivoli Storage Manager server. See “Backup strategies” on page 32.

You can use Data Protection for Exchange to restore mailbox databases to a Recovery Storage Group (Exchange Server 2007) or a Recovery Database (Exchange Server 2010). See “Restore using the Recovery Storage Group or Recovery Database” on page 103 for details on performing this procedure. With Microsoft Exchange Server, you can also use the item Recovery feature of the Exchange Client to recover messages and folders which are accidentally deleted. Exchange Server also provides a “deleted mailbox” feature to recover deleted mailboxes. For more information, see your Microsoft Exchange Server documentation. Data Protection for Exchange also has a Mailbox Restore feature that enables mailbox and item level restore operations using a batch or drag-and-drop selection method.

Data Protection for Exchange also has a Mailbox Restore feature that enables mailbox and item level restores using a batch or drag-and-drop selection method.

The **restorefiles** command restores the .edb and .log flat files from specified Data Protection for Exchange VSS or legacy backups into a specified directory. (The Data Protection for Exchange Legacy backups resides on Tivoli Storage Manager server storage). This enables individual mailbox recovery products from other vendors, including mailbox recovery tools to be used (Exchange Server 2007 and Exchange 2010). It is possible to run the **restorefiles** command, from a machine without an Exchange server installed, to a specified directory on the same machine as the Exchange server. See “Restorefiles command” on page 177 for more information about this command.

When a VSS restore operation is initiated, Data Protection for Exchange performs the following actions:

1. Validates the state of Exchange server objects.
2. When using the Data Protection for Exchange GUI, you are prompted whether to dismount the databases within the selected storage group you are restoring into.
3. Begins a session with a Tivoli Storage Manager server.
4. Verifies that the VSS service is running and that the Exchange writer is available.
5. The Tivoli Storage Manager VSS Requestor performs the VSS snapshot restore preparation stage.
6. The Tivoli Storage Manager VSS Requestor restores the backup data.
7. The Tivoli Storage Manager VSS Requestor marks the restore as complete in VSS.
8. Optionally, mounts databases to run recovery.

Mailbox restore processing: Actions

When a mailbox restore operation is initiated, Data Protection for Exchange performs the following actions:

1. Starts a session with the Tivoli Storage Manager server.
2. Queries the Tivoli Storage Manager server for a list of available backups.
3. Selects an appropriate backup based on user input.
4. Creates an Exchange Recovery Storage Group, or Exchange Recovery Database on a specified directory.
5. Restores the selected backup into the Exchange Recovery Storage or Database Group.

Note: For Exchange 2007, Data Protection for Exchange will restore the databases necessary for the mailbox restore operation only, not the entire group. When restoring from multiple mailboxes with the same mailbox restore operation, each database to be restored will be restored only once, even if the mailboxes to be restored are on different databases or storage groups, or both.

6. Copies individual mailboxes or individual mailbox items from the Exchange Recovery Storage or Database Group into the original mailbox or other location.
7. Removes the Exchange Recovery Storage Group or Exchange Recovery Database and all associated files.

Mailbox restore Browser

When the Mailbox Restore Browser is started, Data Protection for Exchange performs the following actions:

- Detects if there is an existing recovery storage group or database that was previously created by Data Protection for Exchange. If one exists, the browser will automatically connect to that and display its contents. If there is not an existing recovery storage group or database, launch the mailbox selection dialog. In this dialog, the user selects a mailbox or database to browse.
- Starts a session with the Tivoli Storage Manager server.
- Queries the Tivoli Storage Manager server for a list of available backups.
- Selects an appropriate backup based on user input.
- Creates a recovery storage group or database, and restores the selected backup into the recovery storage group or database.
- Connects to the recovery storage group or database and displays the contents.

After the you select the items and they have been restored, you can optionally remove the recovery storage group or database.

Restore methods

Data Protection for Exchange provides a Legacy method and a VSS method for restoring your data.

Legacy Restore

A legacy restore refers to restoring Exchange Server 2007 "traditional streaming" backups.

It restores legacy backups (Exchange database files and log files) from Tivoli Storage Manager server storage to their original location. Like a legacy backup, it uses a specialized API restore that functions with the Exchange server storage engine. It is occasionally referred to as the Exchange server streaming backup and restore API.

Legacy backups, also referred to as traditional "streaming" backups, cannot be restored using Exchange Server 2010. Instead, VSS Backups (and VSS restores) are available.

VSS Restore

A VSS Restore restores VSS Backups (Exchange database files and log files) that reside on Tivoli Storage Manager server storage to their original location.

The following characteristics are true of VSS Restores:

- Full, copy, incremental, and differential backup types can be restored. Database copy backup types are not supported by VSS, and therefore cannot be restored.
- VSS Restore granularity is at the database level.
- Supports restoring one or more storage groups (Exchange Server 2007) or databases (Exchange Server 2010) from a VSS snapshot backup located on Tivoli Storage Manager server storage.
- Restores can be performed in a Microsoft Cluster Server (MSCS) or Veritas Cluster Server (VCS) environment.
- Supports restoring a VSS Backup (directly from Tivoli Storage Manager server storage) to an alternate machine.
- Supports restoring a VSS Backup to an alternate storage group (Exchange Server 2007) or database (Exchange Server 2010).
- Supports restoring an Exchange Server 2007 backup taken from an LCR or CCR replica into the production server. Single Copy Cluster (SCC) local backups can be restored to other nodes in the cluster. Cluster Continuous Replication (CCR) local backups can only be restored to the node that performed the backup.
- Supports restoring an Exchange Server 2010 backup taken from a DAG replica into the production server.
- Supports restoring a backup taken from a relocated storage group (Exchange Server 2007) or database (Exchange Server 2010) into the production server.

VSS Fast Restore

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

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

- Full, copy, incremental, and differential backup types can be restored. Database copy backup types are not supported by VSS and therefore, cannot be restored.
- Restore granularity is at the database level.
- The key component of producing a VSS Fast Restore is the speed with which the application can become operational with the data that resides on local shadow volumes. Be aware that 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.
- 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.
- Supports restoring an Exchange Server 2007 backup taken from an LCR or CCR replica into the production server. Single Copy Cluster (SCC) local backups can be restored to other nodes in the cluster. Cluster Continuous Replication (CCR) local backups can only be restored to the node that performed the backup.
- Supports restoring an Exchange Server 2010 backup taken from a DAG replica into the production server.
- Supports restoring an Exchange Server 2007 backup taken from a relocated storage group into the production server.
- Supports restoring an Exchange Server 2010 backup taken from a relocated database into the production server.

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.

A VSS Instant Restore is only possible when all of the data (from the storage group or database specified for restore) resides on storage subsystems supported by the VSS Instant Restore. If part of the data being restored (including the log files) resides on a local disk, a VSS Fast Restore is performed. 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. However, this check is not necessary for XIV, SAN Volume Controller, or Storwize V7000 with space-efficient target volumes.

When performing a VSS Instant Restore, you must restore *all* databases within the specified storage group. You cannot perform a partial restore (*partial*) while using VSS Instant Restore. Although Data Protection for Exchange allows this operation to begin, it will either fail or complete incorrectly. If you need to restore just one

database from a VSS Backup that resides on local VSS shadow volumes on DS6000, DS8000, SAN Volume Controller, Storwize V7000, or XIV, select the *Disable VSS Instant Restore* option in the Data Protection for Exchange GUI Restore tab 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 (Exchange Server 2007) or Recovery Database (Exchange Server 2010).
- A VSS restore into a relocated or alternate storage group.
- A VSS restore from an Exchange Server 2007 LCR replica backup.

Although VSS Instant Restore is the default restore method when all Exchange 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 that is used by the DSMAGENT. 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.

Compatibility with earlier versions:

Backups that are created on local shadow volumes with earlier versions of IBM Tivoli Storage FlashCopy Manager have different compatibility, depending on whether the backups reside on **DS** storage or on **SAN Volume Controller** storage.

On **DS** storage:

- Backups that are created with IBM Tivoli Storage Manager for Copy Services Version 5.3.3 on local shadow volumes that reside on DS storage *cannot* be restored using VSS Instant Restore using IBM Tivoli Storage Manager for Copy Services Version 5.5.1 or Tivoli Storage FlashCopy Manager. You must create backups on local shadow volumes (residing on DS storage) using IBM Tivoli Storage Manager for Copy Services Version 5.5.1 or Tivoli Storage FlashCopy Manager in order to restore them using VSS Instant Restore.
- Backups that are created with IBM Tivoli Storage Manager for Copy Services Version 5.3.3 on local shadow volumes (residing on DS storage) can be restored using VSS Fast Restore using IBM Tivoli Storage Manager for Copy Services Version 5.5.1 or Tivoli Storage FlashCopy Manager.

On **SAN Volume Controller** storage:

Backups that are created with IBM Tivoli Storage Manager for Copy Services Version 5.3.3 on local shadow volumes that reside on SAN Volume Controller storage *can* be restored using VSS Instant Restore (and VSS Fast Restore) using IBM Tivoli Storage Manager for Copy Services Version 5.5.1 or Tivoli Storage FlashCopy Manager.

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_spaceefficientvdisks_3r7ayd.html

Attention: 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 has not yet completed. 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 minimize the demands 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 Data Protection for Exchange.

The following sections provide guidance and recommendations for effective use of Data Protection for Exchange with SAN Volume Controller and Storwize V7000.

Use of Data Protection for Exchange with SAN Volume Controller and Storwize V7000:

Data Protection for Exchange 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 Data Protection for Exchange 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.

- In order to determine how much storage space is required for each local backup, be aware that the backup LUNs require the same amount of storage space as the original LUNs. For example, if you have a 100GB database residing on a 200GB LUN, you will need a 200GB LUN for each backup version.
- 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 $1.2 \times 5\% = 6\%$ 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 Data Protection for Exchange 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.

Data Protection for Exchange and 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 8. Snapshot restore and delete behavior on SAN Volume Controller and Storwize V7000 space-efficient target volumes

Use Cases / Objectives	SVC and Storwize V7000 Settings	VSS Provider Settings	Data Protection for Exchange Settings	Comments
Production application data resides on standard volumes. Keep 14 snapshot backup versions. Use minimum storage space for snapshot backup versions. A full physical copy is 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 the policy to retain 14 local backup versions. Schedule snapshot backups as wanted using backup destination =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.

Table 8. Snapshot restore and delete behavior on SAN Volume Controller and Storwize V7000 space-efficient target volumes (continued)

Use Cases / Objectives	SVC and Storwize V7000 Settings	VSS Provider Settings	Data Protection for Exchange Settings	Comments
Production application data resides on standard volumes. Keep one snapshot backup version. Use minimum storage space for snapshot backup versions. A full physical copy is not required. Perform 1 VSS backup per day and also send the backup to Tivoli Storage Manager.	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 the policy to retain 2 local backup versions. Schedule snapshot backups as wanted using backup destination =both.	Set the policy for local snapshot backups to retain N+1 backup versions so that N snapshot backups are available for restore. Otherwise, a local backup version may not be available should a VSS backup fail after the prior backup was deleted.
Production application data resides on standard volumes. Keep one snapshot backup version. A full physical copy is required. Minimize overhead of background copies. Perform one VSS backup per day and send the backup to Tivoli Storage Manager.	Create one standard target volume for each source volume to be protected. Add standard target volumes to the VSS free pool.	Use the default background copy rate (50). Configure to use Incremental FC.	Set the policy to retain 1 local backup version. Schedule snapshot backups as wanted using backup destination =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.
Production application data resides on standard volumes. Keep two snapshot backup versions. Full physical copies are required for local backup versions. Perform VSS backups every 12 hours with one backup daily sent to Tivoli Storage Manager.	Create 3 standard target volumes for each source volume to be protected. Add standard target volumes to the VSS free pool.	- use default background copy rate (50)	Set the policy to retain 3 local backup versions. Schedule VSS backups as follows: backup destination = local at 11:00, backup destination = both at 23:00.	Set the policy for local snapshot backups to retain N+1 backup versions so that N snapshot backups are available for restore.

Table 8. Snapshot restore and delete behavior on SAN Volume Controller and Storwize V7000 space-efficient target volumes (continued)

Use Cases / Objectives	SVC and Storwize V7000 Settings	VSS Provider Settings	Data Protection for Exchange Settings	Comments
Production application data resides on standard volumes. Keep four snapshot backup versions. Use minimum storage space for snapshot backup versions. A full physical copy is not required. Perform VSS backups every 6 hours with one backup daily sent to Tivoli Storage Manager.	Create 5 SE target volumes for each source volume to be protected. Enable autoexpand for the SE target volumes. Add SE target volumes to the VSS free pool.	- set background copy rate = 0	Set the policy for local snapshot backups to retain 5 local backup versions. Schedule VSS backups as follows: backup destination = local at 06:00, 12:00 and 18:00, backup destination = 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 two snapshot backup versions. A full physical copy is required for local backup versions. Perform VSS backups every 6 hours with one backup daily sent to Tivoli Storage Manager.	Create 3 SE target volumes for each source volume to be protected. Allocate the same percentage of real storage as for source volumes. Add SE target volumes to the VSS free pool.	Use default background copy rate 50.	Set the policy to retain 3 local backup versions. Schedule VSS backups as follows: backup destination = local at 06:00, 12:00 and 18:00, backup destination = both at 00:00.	Set the policy for local snapshot backups to retain N+1 backup versions so that N snapshot backups are available for restore. This 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.

Data Protection for Exchange 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 deleted from storage. This destructive restore operation only occurs when VSS Instant Restore operations occur in an environment where Data Protection for Exchange 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. This is a known limitation.

Table 9. 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 `ibmvcsf` 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 `ibmvcsf 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 earlier versions of Data Protection for Exchange is supported. After upgrading and configuring Data Protection for Exchange 6.3, use VSS Restore for local VSS Backups that were originally created with Data Protection for Exchange 6.1.2.

Guidelines for SAN Volume Controller and Storwize V7000 environments

Review the following guidelines before attempting backup operations. Further information is available at <http://publib.boulder.ibm.com/infocenter/svcic/v3r1m0/index.jsp>.

- 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 of the backup versions you require. If 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 `ibmvfcg set backgroundCopy 0` command. To make the changes effective, 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 a 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 attached to the SAN Volume Controller.
- Make sure that IBM VSS hardware provider 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 remotely mount NOCOPY FlashCopy backups. However, SAN Volume Controller or Storwize V7000 are required to restore a NOCOPY FlashCopy backup.
- 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 hotfixes).
- Configuration instructions for creating FlashCopy mappings of NOCOPY backups on SAN Volume Controller or 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.

Restoring VSS Backups into alternate locations

Data Protection for Exchange allows an Exchange Server 2007 storage group, CCR replica, or LCR replica (that has been backed up using VSS) to be restored into the Recovery Storage Group or into an alternate (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 an alternate (or relocated) database.

This restore capability is referred to as a "restore into" scenario and requires the following:

- If you are operating a VSS Restore of a relocated storage group or relocated database, you must use the *Restore Into* function and specify the same storage group name or database name as the one you are restoring. The restore will fail if you do not specify the same name.
- Performing any type of restore into function will automatically disable VSS Instant Restore.

Note: Cluster Continuous Replication (CCR) local backups can only be restored to the node that performed the backup.

Microsoft Cluster Server and Veritas Cluster Server support

Data Protection for Exchange supports Exchange Server 2007 servers running in Microsoft Cluster Server (MSCS) and Veritas Cluster Server (VCS) configurations.

Attention: References to the Exchange Server in this section pertain to the virtual Exchange Server name in an MSCS or VCS environment.

The following list provides information for your consideration when running Data Protection for Exchange in an MSCS or VCS environment:

- Data Protection for Exchange must be installed on all nodes of the cluster. In addition, when installing Data Protection for Exchange, it must be installed on a disk local to each node (not a shared cluster disk).
- Use identical configurations in the Tivoli Storage Manager options file when configuring Data Protection for Exchange on each node of the cluster. You must specify *clusternode yes* in the Data Protection for Exchange options file.

- When using the Tivoli Storage Manager scheduler for automating backups, you must install the scheduler service on all nodes of the cluster to enable failover support. See “Using the Tivoli Storage Manager scheduler” on page 109 for more information.
- The Tivoli Storage Manager server treats backups as coming from a single server (the virtual Exchange server) regardless of the cluster node on which the backup was performed.

Support for VSS backups in clustered environments

The following support is provided:

- **Fast Restore:** file-level copy restore is available from any active node in the cluster. A Fast Restore can be run from any active node in the Windows 2008 Failover Cluster. VSS Instant Restore, volume-level restore operations continue to be available from any active node in the cluster.
- **Policy enforcement:** a specified number of snapshot copies for VSS Backup operations are stored to LOCAL or BOTH after a cluster failover. If the policy is set to retain a certain number of copies, the Tivoli Storage Manager server retains that number of VSS backup copies. For example, if the policy copy group has VEREXISTS=3 on a two-node Failover Cluster, the Tivoli Storage Manager server keeps a total of three snapshot copies.
- **Deleting VSS backups:** VSS snapshots can be deleted from any active node in the Failover Cluster.
- **Monitoring snapshots:** snapshots are stored on the SAN. Snapshots can no longer be monitored using local tools such as the Microsoft VSHADOW or DISKSHADOW applications. Instead, monitor snapshots using Tivoli Storage Manager server tools or tools provided by the SAN.

Globalization

Data Protection for Exchange supports the following languages:

- American English
- Brazilian Portuguese
- French
- German
- Italian
- Japanese
- Korean
- Simplified Chinese
- Spanish
- Traditional Chinese

If you want to use a language other than English, you must install the Language Pack for the desired language. See the description of “Installing and activating the language packs” on page 57 for detailed information.

Chapter 2. Planning for Data Protection for Microsoft Exchange Server operations

Planning information regarding backup strategies, Tivoli Storage Manager policy, available options, and preference settings is provided.

Preparing for VSS Instant Restore in DS6000, DS8000, Storwize V7000, XIV and SAN Volume Controller environments

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

These preparations are only applicable to the DS6000, DS8000, Storwize V7000, XIV and SAN Volume Controller disk subsystems.

Consider the following points when planning for VSS Instant Restore:

- Restore granularity is at the storage group level for Exchange Server 2007, and at the database level for Exchange Server 2010.
- VSS requires that data must always be restored to the same drive letters and paths as existed during the original backup.
- VSS requires IBM System Storage Support for Microsoft Volume Shadow Copy Service software if using a DS8000, Storwize V7000, or SAN Volume Controller disk subsystem.
- VSS requires IBM XIV Provider for Microsoft Windows Volume Shadow Copy Service if you are using an XIV disk subsystem.
- Backups must reside on the same XIV, DS6000, DS8000, Storwize V7000, or SAN Volume Controller storage subsystem to which they are restored.
- In a CCR environment, stop the Microsoft Exchange Replication Service on the active node before running the VSS Instant Restore operation.
- In a DAG environment, stop the Microsoft Exchange Replication Service on the active node before running the VSS Instant Restore operation.

How Tivoli Storage Manager server policy affects Data Protection for Exchange

Tivoli Storage Manager policy determines how Data Protection for Exchange backups are managed on Tivoli Storage Manager storage.

The Tivoli Storage Manager server recognizes Data Protection for Exchange as a node. Data that is backed up to Tivoli Storage Manager storage from this Data Protection for Exchange node is stored and managed according to settings specified for Tivoli Storage Manager server policy items.

Tivoli Storage Manager policy can manage the VSS Backups that are placed on local shadow volumes as well as in Tivoli Storage Manager server storage pools. The Tivoli Storage Manager server is responsible for managing VSS Backups, whether the backup is stored on local shadow volumes or on the Tivoli Storage Manager server. Be aware that while a VSS snapshot (created for backup to Tivoli Storage Manager server storage) is deleted after the backup completes, a VSS

snapshot (created for backup to local shadow volumes) remains active until the backup version is expired according to the policy settings for VSS Backups on local shadow volumes.

The number of local backup versions maintained by the Tivoli Storage Manager server is determined by the value that is specified by the Tivoli Storage Manager server *verexists* parameter (defined in the copy group of the management class to which the local backup belongs). The number of Target Volume sets allocated for local backups should be equal to the *verexists* parameter. For example, if *verexists*=3, then at least three sets of Target Volumes must be allocated for the backup to complete successfully. If only two sets of Target Volumes are allocated, the third and subsequent backup attempt will fail. If more sets of Target Volumes exist than the number specified by the *verexists* parameter, these sets are ignored by the Tivoli Storage Manager server.

The policy management of local backups is responsible for reconciling the local backup repository with the information stored on the Tivoli Storage Manager server. For example, if Target Volume LUNs that were used for a local backup are removed from the storage subsystem, the information representing the backup on the Tivoli Storage Manager server must be reconciled. Likewise if the Tivoli Storage Manager server policy has determined that a local backup copy is no longer needed, the local backup manager must free the Target Volume LUNs to the storage subsystem so that these LUNs can be used for future backup operations. Tivoli Storage Manager automatically detects these situations and performs the reconciliation.

For information about Tivoli Storage Manager, see this topic: http://publib.boulder.ibm.com/infocenter/tsminfo/v6r3/topic/com.ibm.itsm.client.doc/c_mgtc_understand.html.

Storage space considerations for local shadow volumes

Tivoli Storage Manager requires that sufficient storage space be available to create shadow volumes required for VSS Backup processing. Even when the VSS Backup destination is the Tivoli Storage Manager server, storage space to create a shadow volume is still required (though on a temporary basis).

Since the value of the *verexists* parameter (specified for your local backup policy) determines the number of backup versions to retain on local shadow volumes, a *verexists*=1 setting will cause the deletion of an existing backup on local shadow volumes (during a VSS Backup to Tivoli Storage Manager server storage) in order to create enough temporary space for the new snapshot. Therefore, if you want to keep *N* backups on local shadow volumes and also perform VSS Backups to Tivoli Storage Manager server storage, make sure you provision enough storage space on local shadow volumes and specify *verexists*=*N*+1.

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

It is possible for VSS Backups (that Data Protection for Exchange creates and stores on local shadow volumes) to be modified and deleted from outside of Tivoli Storage Manager control. For example, the Microsoft VSSADMIN DELETE SHADOWS command can remove a VSS Backup managed by Tivoli Storage

Manager without Tivoli Storage Manager being able to prevent such a removal. In such a situation, Tivoli Storage Manager recognizes the backup removal and reconciles its index of available backups with what resides on local shadow volumes. It is important to be aware of this potential for removal and establish a strategy that protects VSS Backup data stored on local shadow volumes from being compromised.

Be aware that the following issues impact your Tivoli Storage Manager policy for managing VSS Backups:

- Overall backup strategy.
- Length of time that VSS Backups will reside on Tivoli Storage Manager server storage.
- Number of VSS Backup versions to reside on Tivoli Storage Manager server storage.
- Types of VSS Backups to reside on Tivoli Storage Manager server storage.
- Number of VSS Backup versions to reside on local shadow volumes.
- Types of VSS Backups to reside on local shadow volumes.
- The amount of available target volume storage provisioned for VSS operations.

Security

Data Protection for Exchange must be registered to the Tivoli Storage Manager server and use the appropriate node name and password when connecting to the Tivoli Storage Manager server. Standard Tivoli Storage Manager security requirements apply to Data Protection for Exchange.

Security requirements for Data Protection for Exchange backup and restore tasks on Exchange Server 2010

To perform backup and restore tasks on Exchange Server 2010, Data Protection for Exchange must be operating in an account with membership in the Organization Management group.

For additional mailbox restore task requirements, see:

- “Security requirements for Data Protection for Exchange mailbox restore tasks on Exchange Server 2010” on page 32
- “Prerequisites for Data Protection for Exchange mailbox restore tasks on Exchange Server 2010” on page 187

Security requirements for Data Protection for Exchange backup and restore tasks on Exchange Server 2007

To perform backup and restore tasks on Exchange Server 2007, Data Protection for Exchange 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 group and the Exchange Recipient Administrators group. If these default settings change, you must manually add the account to these other groups.

For additional mailbox restore task requirements, see:

- “Security requirements for Data Protection for Exchange mailbox restore tasks on Exchange Server 2007”
- “Prerequisites for Data Protection for Exchange mailbox restore tasks on Exchange Server 2007” on page 187

Security requirements for Data Protection for Exchange mailbox restore tasks on Exchange Server 2010

To perform mailbox restore tasks on Exchange Server 2010, Data Protection for Exchange must be operating in an account with membership in the Organization Management group.

The account must have a live Exchange mailbox in the domain.

Security requirements for Data Protection for Exchange mailbox restore tasks on Exchange Server 2007

To perform mailbox restore tasks on Exchange Server 2007, Data Protection for Exchange must be operating in an account with membership in the Exchange Organization Administrators group.

The account must have an Exchange mailbox in the domain.

By default, Windows adds the Exchange Organization Administrators group to other security groups, such as the local Administrators group and the Exchange Recipient Administrators group. If these default settings change, the account must be manually added to these other groups.

Backup strategies

Depending on your specific requirements regarding network traffic, 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 or databases of the Exchange Server.
- You should not mix incremental and differential backups. Differential backups will only back up changes made since the last incremental backup. Incremental backups performed after differential backups contain all changes since the last incremental or full backup. Restores are more complicated when using a mixed strategy. You need to determine on an individual basis which transaction log backups (differential or incremental) to restore along with the full backup.
- When scheduling Legacy and VSS Backups, make sure they do not overlap.
- Incremental and differential legacy backups cannot be restored with full or copy VSS Backups.
- If you are using Exchange Server 2007, consider using Exchange Server LCR, CCR, or SCR replication technology to help protect your Exchange Server and possibly reduce the frequency of backup operations. Refer to your Microsoft documentation for details regarding this technology.

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

Full backups only

Only full backups are performed with this strategy.

This approach is best for Exchange Servers that are relatively small because each backup contains enough data to restore the entire storage group. Each backup takes longer to perform, but the restore process is the most efficient because only the most recent (or other appropriate) full backup needs to be restored.

Full backup plus incremental backups

This strategy is commonly used when the normal backup window or network capacity cannot support a full backup each time.

In such cases, a periodic full backup followed by a series of incremental backups allows the backup window and network traffic to be minimized during peak usage times. For example, you can perform full backups on the weekend and incremental backups during the week. The full backups can be done during low usage times when a larger backup window and increased network traffic can be tolerated. The restore process becomes more complex, however, because a full backup, as well as subsequent incremental backups, must be restored. In addition, transactions within the logs must be applied which increases process time. As a result, the more transactions applied, the longer the recovery process.

If you use this backup strategy, you must decide whether the Tivoli Storage Manager storage management policies are modified, to ensure all incremental backups are stored together on the Tivoli Storage Manager server (collocated). This helps improve restore performance by reducing the number of media mounts necessary for restoring a series of incremental backups. See “How Tivoli Storage Manager server policy affects Data Protection for Exchange” on page 29 for more information.

Full backup plus differentials

This strategy provides an easier restore than the full plus incremental backup strategy.

This approach might be useful if your backup window and network capacity can process the backup of all transaction logs that accumulate between full backups. This is because it requires the transfer of only one differential plus the last full backup to accomplish a restore. However, the same amount of data must be transferred in the differential image, as in the series of incremental backups.

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

You should carefully consider whether there is sufficient advantage to justify the additional resource necessary to resend all prior transaction logs with each subsequent differential backup.

Using VSS and Legacy Backups together (Exchange Server 2007)

With Exchange Server 2007, you can use both VSS and Legacy Backups in your complete backup strategy, but you cannot mix the two types of backups.

Microsoft supports and recommends using both VSS and Legacy Backups in your complete backup strategy. However, Microsoft also states that you cannot mix the two types of backups. For example, a Legacy incremental or differential backup cannot be applied to a VSS full or copy backup. This is noted in the Microsoft Exchange Server SDK documentation. The Exchange store will prevent you from mixing backup types.

Also, be aware of the following best practices:

- Legacy and VSS Backups to Tivoli Storage Manager server storage are usually dictated by time, not versions.
- Backups to local shadow volumes are usually dictated by versions because of space limitations and provisioning of VSS storage.

Table 10. Backup strategy characteristics

Strategy characteristics	Legacy backup only	Legacy backup plus VSS backup
Available backup types:	COPY 1+ per month FULL 1+ per week INCR 1+ per day	Legacy COPY 1+ per month Legacy FULL 1+ per week VSS FULL 1+ per day VSS FULL CCR or LCR copies 1+ per week ¹

Table 10. Backup strategy characteristics (continued)

Strategy characteristics	Legacy backup only	Legacy backup plus VSS backup
Available restore types:	Restore to the production Exchange Server	<p>VSS:</p> <ul style="list-style-type: none"> • VSS Restore² • VSS Fast Restore³ • VSS Instant Restore⁴ <p>Legacy:</p> <ul style="list-style-type: none"> • Restore to the production Exchange Server
	Mailbox restore to the production Exchange Server (restore data to its original location or to an alternate mailbox or folder)	<p>Exchange Server 2007</p> <ul style="list-style-type: none"> • Mailbox restore from Legacy and VSS Backups <ul style="list-style-type: none"> – Mailbox restore to the production Exchange Server (restore data to its original location or to an alternate mailbox or folder) – Mailbox restore to Exchange Server personal folders (.pst) file
	Mailbox restore to Exchange Server personal folders (.pst) file	<p>Exchange Server 2010</p> <ul style="list-style-type: none"> • Mailbox restore from VSS Backups <ul style="list-style-type: none"> – Mailbox restore to the production Exchange Server (restore data to its original location or to an alternate mailbox or folder) – Mailbox restore to Exchange Server personal folders (.pst) file
		<p>FULL, COPY</p> <p>Server and storage group level restore granularity</p> <p>Point-in-time recovery</p> <p>Roll-forward recovery</p> <p>Restore to alternate machine</p> <p>Restore to relocated or alternate storage group⁵</p> <p>Recovery Storage Group⁶</p>

Table 10. Backup strategy characteristics (continued)

Strategy characteristics	Legacy backup only	Legacy backup plus VSS backup
Restore attributes:	<p>FULL, COPY, INCR, DIFF, DBCOPY</p> <p>Server and storage group level restore granularity</p> <p>Point-in-time recovery</p> <p>Roll-forward recovery</p> <p>Restore to alternate machine</p> <p>Recovery Storage Group</p>	
1	VSS Backups of CCR and LCR copies are available on Exchange Server 2007 only.	
2	Files are copied from the Tivoli Storage Manager server directly to the production source volumes.	
3	Files are copied from local shadow volumes directly to the production source volumes.	
4	Snapshot volumes are copied to the production source volumes. SAN Volume Controller, Storwize V7000, DS6000, DS8000, or XIV is required to perform this type of restore.	
5	VSS Backups of Exchange Server 2007 data can be restored to a relocated storage group or to an alternate storage group. VSS Backups of Exchange Server 2010 databases can be restored to a Recovery Database or to an alternate database.	
6	Legacy backups can be restored to the Recovery Storage Group on Exchange Server 2007. VSS Backups can be restored to the Recovery Storage Group on Exchange Server 2007 or to the Recovery Database on Exchange Server 2010.	

Using VSS operations in a Single Copy Cluster environment

Data Protection for Exchange supports VSS operations in an Exchange Server Single Copy Cluster (SCC) environment. Review these requirements and limitations before attempting operations in a VSS cluster.

Single Copy Cluster requirements for VSS

VSS operations in a cluster environment have special requirements, which include dsm.opt files options and parameter settings for node registration.

Restriction: SCC clustering is not supported by Microsoft with Exchange Server 2010.

The following requirements must be met for VSS operations to perform successfully in a Single Copy Cluster environment:

- The *vssaltstagingdir* option must be specified when the following circumstances are true of your cluster environment:
 - Tivoli Storage Manager performs the VSS operations.
 - VSS Backups are stored on local shadow volumes.

- Make sure you have at least 200 megabytes of free disk space on the drive that the *vssaltstagingdir* option specifies. This space is used to hold the metadata files for Data Protection for Exchange.

This option must be specified in the dsm.opt file for all potential *localdsmagentnode* nodes that could be running the Tivoli Storage Manager Remote Client Agent Service (DSMAGENT):

```
vssaltstagingdir d:\dir
```

d: represents a shared drive that is accessible by all nodes in the cluster. It can also be a disk that follows the Virtual Exchange Server. \dir represents a directory located on the shared drive. This option must be specified on all nodes that are used in the cluster. For example:

```
vssaltstagingdir Q:\TSMVSS
```

- Make sure to specify the following options in each of the dsm.opt files that are used for the LOCALDSMAGENT, REMOTEDSMAGENT, and OFFLOAD machines:

```
CLUSTERNODE NO  
CLUSTERDISKONLY NO
```
- When running Tivoli Storage FlashCopy Manager in stand-alone mode (that is, not connected to the Tivoli Storage Manager server), if you are changing the *vssaltstagingdir* option, you must change its value to the same value in BOTH the dsm.opt file for the DSMAGENT and the dsm.opt file for Data Protection for Exchange.

Single Copy Cluster limitations for VSS

VSS operations in a Single Copy Cluster environment have certain limitations, for example, failover considerations and restrictions on the node to be restored to.

Be aware of these limitations when performing VSS operations in a cluster environment:

- All servers within the cluster must use the same levels of Tivoli Storage Manager, Windows, and other applicable software.
- Microsoft KB 919117 is required to perform VSS Instant Restore in a Windows Server 2003 cluster environment.
- Dynamic disks are not supported.
- Data Protection for Exchange supports MSCS cluster failover and failback with the following limitations, which are consequences of the Microsoft VSS service not being cluster-aware:
 - On Windows Server 2003, target volumes used for snapshot backups on one node in the cluster cannot be reused for a subsequent backup from another node in the cluster. To continue normal snapshot backup activity after a failover, ensure that additional target volumes or snapshot space are available in the VSS provider free pool to create new snapshots. To be able to continue to maintain the number of backup versions defined in the backup policy in failover scenarios, you must allocate that number of target LUNs times the number of cluster nodes in the VSS free pool so that the version limit number of snapshots can be created on each node in the cluster. For a typical two-node cluster, allocating twice the version limit of target LUNs is recommended. Note that XIV does not require that target LUNs are predefined. Therefore, allocating extra target LUNs does not apply to XIV storage devices

- Instant restore from snapshot backups is possible on any node in the cluster, regardless of where the snapshot was created, provided that the backup version has not been expired by Tivoli Storage FlashCopy Manager. However, file copy restore from snapshot backups is only possible on the cluster node where the snapshot was created. This assumes that the VSSALTSTAGINGDIR option is set to the same value in the DSM.OPT files on all possible nodes in the cluster, and that the directory that it points to is accessible from the active node.
- On Windows Server 2003, snapshot backups deleted because of policy enforcement on a node other than where the snapshot was created are not returned to the VSS free pool until failover or failback occurs to the node where the snapshot was created and reconciliation is run (for example, a new backup is run).
- The Tivoli Storage Manager Client Acceptor Daemon (CAD) must be installed on each cluster node so that it can continue operations in the event of a failover. Make sure the CAD service name is the same on all cluster nodes so that it can be started by a generic cluster service.
- It is recommended that the Local DSMAgent client node be a separate node from your normal backup-archive client, as this CAD service will need to be made a non cluster option.
- The Remote DSMAgent client node does not require you to register a separate node for each server within the cluster as this server only acts as a secondary server.
- Use the Microsoft **vssadmin** and **vshadow** commands to verify the environment. You can use the **DISKSHADOW** tool on Windows 2008 or later.
- A Data Protection for Exchange configuration file should be configured for each node in the cluster. These files are almost identical, except that the *localdsmagentnode* parameter points to the corresponding local DSMAgent on each node.

If you plan to perform scheduled VSS operations in a Single Copy Cluster environment, be aware of these considerations:

- Install the Tivoli Storage Manager scheduler as a Windows service on both cluster nodes.
- If the command file resides on a local drive, you must make sure that it remains consistent on all cluster nodes. Optionally, you can create the command file on a shared drive. Make sure the *objects* parameter (specified with the **define schedule** command on the Tivoli Storage Manager server) points to this command file.

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

When creating policy for your backups, consider these differences between backing up data to Tivoli Storage Manager storage versus VSS disks.

Tivoli Storage Manager storage

A Tivoli Storage Manager backup operation stores the backed up data on Tivoli Storage Manager server storage. Although this type of backup typically takes longer to process than a backup to local shadow volumes, a Tivoli Storage Manager backup is necessary when long term storage is needed such as saving Exchange data on tape for archival purposes. Tivoli Storage Manager backups are

also necessary for disaster recovery situations when the disks that are used for local backups are unavailable. By maintaining multiple backup copies on Tivoli Storage Manager server storage, a point in time copy is available should backups on the local shadow volumes become corrupted or deleted.

Local shadow volumes

Backups to local shadow volumes can be managed by both time and versions. However, because most backup strategies involving local snapshots include a higher frequency of local snapshot creation, IBM recommends that you set up policy for local backups to be based on version limits.

Sufficient local storage space must be available on local shadow volumes for a VSS backup strategy to be successful. Make sure there is enough available storage space assigned to the volumes to accommodate your Data Protection for Exchange backup operations. Environment and storage resources also impact how many backup versions are maintained on local shadow volumes (for VSS Fast Restore and VSS Instant Restore) and how many backup versions are maintained on Tivoli Storage Manager server (VSS Restore and longer term storage). It is recommended that different sets of policies be created for backups to both local shadow volumes and to Tivoli Storage Manager server storage. If you are using a VSS provider other than the Windows VSS System Provider, make sure to review the documentation for that specific VSS provider.

VSS operations in DS, SAN Volume Controller, and Storwize V7000 environments

Be aware of these storage space guidelines when performing VSS operations in DS, SAN Volume Controller, and Storwize V7000 environments.

For information about storage space requirements for space-efficient volumes, see “Use of Data Protection for Exchange with SAN Volume Controller and Storwize V7000” on page 19.

VSS limitations for SAN Volume Controller and Storwize V7000

When performing a Data Protection for Exchange VSS backup (non-offloaded) with backup destination as Tivoli Storage Manager Server, and the Exchange Server data resides on SAN Volume Controller or Storwize V7000 disks, and the IBM TotalStorage VSS Hardware Provider is being used, in some isolated cases the SAN Volume Controller or Storwize V7000 LUNs remain mapped to the Windows host even though the VSS backup is complete. To work around this issue, you can use a backup destination other than TSM (BOTH or LOCAL). You can also manually unmap the volumes attached to the Windows host to work around this issue.

When performing two Data Protection for Exchange VSS backups, back to back, and the Exchange Server data resides on SAN Volume Controller or Storwize V7000 disks, if the volumes are large, the background copy rate is set a low number, or both, it might appear that the second VSS backup is hanging. In fact, it is waiting for the SAN Volume Controller or Storwize V7000 background copy of the first backup to complete before proceeding with the second backup. SAN Volume Controller or Storwize V7000 will not allow two background copies of the same volume to occur at the same time. There is no indication that the second backup is waiting for the first SAN Volume Controller or Storwize V7000 background copy to complete. You might also see timeouts errors if the previous SAN Volume Controller or Storwize V7000 background copy takes too long. To work around this issue, schedule your VSS backups far enough apart to

accommodate this situation. You can also increase the copy rate of the SAN Volume Controller or Storwize V7000 background copy.

See also “Using space-efficient target volumes with SAN Volume Controller and Storwize V7000” on page 23.

VSS operations in IBM N-series and NetApp environments

Be aware of these storage space guidelines when performing VSS operations in IBM N-series and NetApp environments.

Be aware that in environments that contain IBM N-series and NetApp systems, snapshots created using the IBM N-series and NetApp snapshot provider are stored on the same volume where the LUN resides. Disk space consumed by a local backup consists only of the blocks that have changed since the last local backup was created. The following formula can be used to help determine how much space is required for each local backup:

Amount of data changed per hour * number of hours before a local backup expires

In addition, Write Anywhere File Layout (WAFL) reserves blocks equal to two times the specified size of the LUN to be used. This space reservation ensures writes for virtual disks. The following example demonstrates how to calculate the size of these volumes:

```
Database size of an Exchange storage group: 100GB
Number of local backups to be kept: 3
Snapshot for TSM backup: 1
duration for TSM backup: 2hr
Backup frequency: 3hrs
The duration before a local backup is expired: 9 hrs
Amount of data changed/added/deleted per hr: 50MB
Space required for each local backup: 50*9= 450 MB
Space required for 3 local backups + 1 TSM backup: 450*3 + 50*2 = 1450 MB
The volume size required for the storage group: 100*2 (space reservation) + 1.5 = 201.5 GB
```

VSS limitations for NetApp FAS series or IBM N-series

Due to the limitations in SnapDrive 4.2 and any supported prior versions, the VSS Provider for NetApp FAS series and IBM N-series, VSS based operations using Data Protection for Exchange with backup destination set to LOCAL, must be performed in specific ways. Failure to comply with the following configuration and operational recommendations can lead to serious conditions such as premature deletion of snapshots representing VSS backups to LOCAL, backup failure, and out of space conditions on the production volumes. When the limitations in the SnapDrive are addressed by NetApp, Data Protection for Microsoft Exchange Server VSS operations can be fully used. However, this situation is not applicable when FlexVols are used.

Exchange Server storage configuration for NetApp FAS series or IBM N-series VSS operations

If you plan to perform VSS backups with backup destination set to LOCAL, check your setup to ensure that following requirements are met.

- The NAS file server LUNs used by a storage group must be fully dedicated to the storage group. The Microsoft Exchange Server storage groups cannot share LUNs.
- A NAS filer LUN used by the Exchange storage groups must be the only LUN on the filer volume. For example, if Exchange uses four LUNs, there must be four corresponding filer volumes, each volume containing one LUN.

Guidelines for VSS Backup operations for NetApp FAS series or IBM N-series

If you plan to perform VSS backups with backup destination set to LOCAL, these backups must adhere to the following guidelines.

- If the NetApp volume type is Traditional, VSS backups with backup destination set to Local must be bound to a management class that has verExists=1. This setting is not required if flexible volumes are used.
- VSS backups with backup destination set to Local can either be of type full or copy. You can not mix local backups of type full and copy.
- VSS backups with backup destination set to TSM can be full or copy. There are no restrictions on Tivoli Storage Manager backups.
- When performing VSS backups, you must ensure that previous backup has finished completely before starting a new backup. Any overlap of backups can result in undesirable side-effects on the Microsoft Exchange Server, the VSS service, and, the NAS filer.

Sample VSS Backup procedure for NetApp FAS series or IBM N-series

Taking above considerations into account, the following section describes a sample backup procedure that could be used to perform VSS backups using both Tivoli Storage Manager and LOCAL backup destinations in an optimal manner. Note that the following assumptions apply to this sample backup procedure:

- The configuration requirements stated above are met.
- The VSS backup to Tivoli Storage Manager takes one hour to complete.
- The VSS backup to LOCAL takes five minutes to complete.

Your backup procedure could consist of the following backups:

- Daily VSS full backups to LOCAL every four hours - 12am, 4am, 8am, 12pm, 4pm, 8pm.
- Daily VSS full backups to Tivoli Storage Manager storage by one of the following two methods:
 - Specify backupdestination set to BOTH at 12am. Note that this will create a 12am backup to local. Therefore, no separate 12am backup to local is required.
 - Full offloaded-backup at 1am. Note that no VSS local backup will be available to restore from between 1am and 4am when next VSS backup to local will take place.
- Perform weekly VSS-copy backups to Tivoli Storage Manager (offloaded backup) 5am.
- Perform weekly legacy full backups (or as needed).

Recommended Tivoli Storage Manager policy settings

Make sure the following policy items are defined with the recommended settings.

Consult your Tivoli Storage Manager administrator or see the *IBM Tivoli Storage Manager for Windows Administrator's Guide* and the *IBM Tivoli Storage Manager for Windows Administrator's Reference* for complete information on defining or updating these Tivoli Storage Manager policy items.

Domain

A policy domain contains policy sets, management classes, and copy groups.

Create a policy domain on the Tivoli Storage Manager server to be used exclusively for Data Protection for Exchange backups.

Policy sets

Policy sets contain management classes (which contain copy groups) that determine the rules by which Data Protection for Exchange backups are performed and managed.

Define the policy set to the policy domain to which Data Protection for Exchange backups belong. Note that the policy set must be activated and only one policy set can be active in the policy domain.

Management class

A management class is a policy object that users can bind to each file to specify how the file is managed.

Define a management class for backups residing on local shadow volumes and a management class for backups residing on Tivoli Storage Manager server storage. Different management classes provide the opportunity for specialized policies for each storage destination. For example, you can maintain six versions of local VSS Backups of a given storage group (*VERExists*=6) while maintaining only two versions of the same storage group on Tivoli Storage Manager server storage (*VERExists*=2). In addition, you can create a separate management class for copy backup types for use in long term storage. Such policies can maximize storage resources and provide more control over your storage strategy.

Note that since VSS Backup processing requires sufficient storage space to create shadow volumes, make sure you specify *verexists*=*N*+1 in order to keep *N* backups on local shadow volumes. See "Storage space considerations for local shadow volumes" in "How Tivoli Storage Manager server policy affects Data Protection for Exchange" on page 29 for further recommendations.

Be aware that since Legacy backups on Tivoli Storage Manager server storage, VSS Backups on Tivoli Storage Manager server storage (COPY and FULL), and VSS Backups on local shadow volumes (COPY and FULL) all have different Tivoli Storage Manager server naming and therefore, can each have their own management class, it is possible to have five active backups of the same storage group. Make sure your backup strategy is planned and well-defined before defining management classes.

Copy group

A copy group controls how backup versions are generated, located, and expired.

Define the copy group as a backup copy group and not an archive copy group. Since Data Protection for Exchange stores all objects as backup objects on Tivoli Storage Manager in backup storage pools, an archive copy group is not required, although an archive copy group can exist. The following backup copy group parameters significantly influence your backup policy:

VERExists

Determines the maximum number of Exchange Server database backup versions to retain for databases that exist on the Data Protection for Exchange client system.

VERDeleted

Determines the maximum number of Exchange Server database backup versions to retain for databases that have been deleted from the Data Protection for Exchange client system after being backed up by Tivoli Storage Manager.

RETEExtra

Determines the number of days to retain an Exchange Server database backup version after that version becomes inactive.

RETOOnly

Determines the number of days to retain the last Exchange Server database backup version of a database that has been deleted from the Data Protection for Exchange client system. Be aware that incremental backups do not participate in expirations (due to version limit) because there is never more than one version of an incremental backup object. This is because incremental backups are always uniquely named. However, all Legacy backup objects for an Exchange Server storage group are deactivated when a new full backup of that Exchange Server storage group is performed (VSS backup objects remain active). Therefore, the retention period set in the *RETOOnly* parameter controls the expiration of incremental backup objects.

When setting the value of the *RETOOnly* parameter for incremental backups, the value must be (at a minimum) as long as the value set for the full backup objects to which the incremental backups are associated. You can use the same management class for incremental backups and the full backup objects (that are retained the longest) to be sure an adequate value is used. However, all Legacy backup objects for an Exchange Server storage group are inactivated when a new Legacy full backup of that Exchange Server storage group is performed (VSS backup objects remain active).

MODE, SERIALization, FREQuency

You can accept default values for these backup copy group parameters as they are not applicable to Data Protection for Exchange.

It is recommended that you discuss these parameters with your Tivoli Storage Manager server administrator in order to accomplish your backup strategy.

Storage pool

A storage pool is a named set of storage volumes that is the destination used by the Tivoli Storage Manager server to store data.

A single restore can require a full backup, a differential backup, and multiple incremental backups. It is recommended to use collocation if these backups are stored on removable media. Use collocation by file space (**define stgpool COLlocate=FILEspace**) if you plan to restore multiple storage groups in parallel. This is recommended because all data for any one storage group is stored within one Tivoli Storage Manager server file space.

Data Protection for Exchange node name: recommended settings

Review these recommended settings when registering your Data Protection for Exchange node name.

The machine where Data Protection for Exchange is installed must be registered to the Tivoli Storage Manager server with a node name. This node name owns and manages all Data Protection for Exchange data that is backed up to the Tivoli Storage Manager server. Specify this node name with the *nodename* option in the *dsm.opt* options file located (by default) in the Data Protection for Exchange installation directory. Note that in order to perform VSS operations, you may need to register node names for additional machines. See “Proxy node definitions (VSS Backups)” for details about this task.

Be aware of the following Tivoli Storage Manager parameter conditions when registering your Data Protection for Exchange node name (machine) to the Tivoli Storage Manager server:

- **MAXNUMMP** This parameter determines the maximum number of mount points a client node is allowed to use on the Tivoli Storage Manager server during a backup operation.
- **TXNGroupmax** This parameter determines the number of files transferred as a group between the client and server between transaction commit points. This parameter must have a value of 12 or greater.
- **COMPRESSIon** This parameter determines whether the Data Protection for Exchange node compresses data before sending it to the Tivoli Storage Manager server during a backup operation. For Legacy operations, specify **COMPRESSIon=Yes** to allow the Data Protection for Exchange node to make the decision whether to compress data using the value of the client **COMPRESSIon** option specified in the options file (*dsm.opt*) located in the Data Protection for Exchange directory. For VSS operations, specify **COMPRESSIon=Yes** in the backup-archive client options file (*dsm.opt*) located in the backup-archive client directory.

Note: If you are running Data Protection for Exchange on a Microsoft Cluster Server or Veritas Cluster Server, it is recommended that the node name match the Exchange virtual server name.

See the *IBM Tivoli Storage Manager for Windows Administrator's Reference* for complete information regarding these parameters.

Proxy node definitions (VSS Backups)

Since Data Protection for Exchange VSS Backup operations are implemented through the Tivoli Storage Manager backup-archive client, you must use node names specifically for VSS operations in addition to using a node name for where Data Protection for Exchange is installed.

As part of the configuration procedure, a proxy relationship is defined for these various node names. This proxy relationship allows node names to perform operations on behalf of another node name. When registering these nodes to the Tivoli Storage Manager server for VSS operations, do not specify the Tivoli Storage Manager **USerid=NONE** parameter. VSS operations will fail when this parameter is specified.

There are two types of node names defined in proxy node relationships:

- **Target node:** A node name that controls backup and restore operations and that also owns the data on the Tivoli Storage Manager server. This is the node name specified in the Data Protection for Exchange dsm.opt file.
- **Agent node:** A node name that performs operations *on behalf* of a target node. This is the node name specified in the Backup-Archive Client dsm.opt file.

Required node names for basic VSS operations

VSS operations require specific node name settings.

To perform basic VSS operations, you must have one target node and one agent node:

Table 11. Required node names for basic VSS operations

Proxy node type	Nodename	Where to specify
Target node	Data Protection for Exchange node name	Use the <i>nodename</i> option in the Data Protection for Exchange options file (dsm.opt)
Agent node	Local DSMAGENT Node (this name must match the backup-archive client node name)	Use the <i>localdsmagentnode</i> parameter in the Data Protection for Exchange configuration file (tdpexc.cfg)

Target node

This is the node name where Data Protection for Exchange is installed. This node name (specified with the *nodename* option in the dsm.opt file) is referred to as the Data Protection for Exchange node name.

Agent node

This is the node name where the backup-archive client and VSS provider are installed. This node is responsible for performing the VSS operations as Data Protection for Exchange itself does not perform any direct VSS operations. This node name is referred to as the Local DSMAGENT Node and is specified with the *localdsmagentnode* parameter in the Data Protection for Exchange configuration file (tdpexc.cfg by default). You can use the **Properties** window from the Exchange Server Protect or Recover workload. In the **Properties** window select VSS Backup, from here you can update the Local DSMAGENT Node name. Otherwise use the **tdpexc set** command to specify this parameter.

Note: The agent node and target node will be on the same machine for basic VSS operations.

Required node names for VSS offloaded backups

VSS offloaded backups require specific node name settings.

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

Table 12. Required node names for VSS offloaded backups

Proxy node type	Nodename	Where to specify
Target node	Data Protection for Exchange node name	Use the <i>nodename</i> option in the Data Protection for Exchange options file (dsm.opt)

Table 12. Required node names for VSS offloaded backups (continued)

Proxy node type	Nodename	Where to specify
Agent node	Local DSMAGENT Node	Use the <i>localdsmagentnode</i> parameter in the Data Protection for Exchange configuration file (tdpexc.cfg)
Agent node	Remote DSMAGENT Node	Use the <i>remotedsmagentnode</i> parameter in the Data Protection for Exchange configuration file (tdpexc.cfg)

Target node

This is the node name where Data Protection for Exchange is installed.

This node name (specified with the *nodename* option in the dsm.opt file) is referred to as the Data Protection for Exchange node name.

Agent node

This is the node name where the backup-archive client and VSS provider are installed. This node is responsible for performing the VSS operations as Data Protection for Exchange itself does not perform any direct VSS operations. This node name is referred to as the Local DSMAGENT Node and is specified with the *localdsmagentnode* parameter in the Data Protection for Exchange configuration file (tdpexc.cfg by default). You can use the **Properties** window from the Exchange Server Protect or Recover workload. In the **Properties** window select VSS Backup, from here you can update the Local DSMAGENT Node name. Otherwise use the **tdpexcc set** command to specify this parameter.

Agent node

The node name of a separate machine that must also have the backup-archive client, VSS provider, and the Exchange System Management Tools installed (make sure you install the same level of the Exchange System Management Tools that is installed on your Exchange production server). This machine is responsible for performing the movement of VSS snapshot data from local shadow volumes to the Tivoli Storage Manager server. It is also responsible for performing the Exchange Integrity Check. This node name is referred to as the Remote DSMAGENT Node and is specified with the *remotedsmagentnode* parameter in the Data Protection for Exchange configuration file (tdpexc.cfg by default). You can use the **Properties** window from the Exchange Server Protect or Recover workload. In the **Properties** window select VSS Backup, from here you can update the Local DSMAGENT Node name. Otherwise use the **tdpexcc set** command to specify this parameter. The choice of available machines depends on whether the machines have access to the local shadow volumes that contain the VSS snapshot backups. This node name is only valid for VSS environments that support transportable shadow copies. It is not supported if you are using the default VSS system provider. Refer to your VSS provider documentation for details.

Make sure that the *localdsmagentnode* and *remotedsmagentnode* are registered to the same Tivoli Storage Manager server that is specified in the Data Protection for Exchange options file (dsm.opt) and the backup-archive client options file (also dsm.opt).

Specifying Data Protection for Exchange options

Once Data Protection for Exchange is registered to Tivoli Storage Manager, several Data Protection for Exchange parameters need to be configured.

The Tivoli Storage Manager administrator should have provided you with the node name, password, and the communications method with the appropriate parameters to connect to the Tivoli Storage Manager server. These values, together with other parameters, are stored in an options file located (by default) in the Data Protection for Exchange installation directory. The default options file name is `dsm.opt`. Edit the `dsm.opt` file using a text editor.

Attention: Make sure that the Data Protection for Exchange options file (`dsm.opt`) and the backup-archive client options file (also `dsm.opt`) specify the same Tivoli Storage Manager server.

The options file includes the following parameters, which are required for initial configuration:

NODename

The Tivoli Storage Manager node name is the unique name by which Tivoli Storage Manager recognizes the machine running Data Protection for Exchange.

COMMMethod

This option specifies the communication protocol to use between the Data Protection for Exchange node with the Tivoli Storage Manager server. Data Protection for Exchange supports the same set of communication protocols supported by other Tivoli Storage Manager clients on Windows platforms. Depending on the chosen *commmethod* the connectivity parameters for that *commmethod* need to be specified as well.

- For Legacy and VSS backups, specify the *commmethod* option in the Data Protection for Exchange options file.
- For VSS Backups, specify the *commmethod* option in the backup-archive client options file that is used as the Local DSMAGENT Node. If the environment is configured for VSS offloaded backups, you must also specify the *commmethod* option in the backup-archive client options file that is used as the Remote DSMAGENT Node.

The following additional options are not required for initial configuration. By default they are not specified, but you can modify the default settings:

PASSWORDAccess

This option instructs the Tivoli Storage Manager API to store the current password (encrypted) in the Windows registry and automatically generates a new one when the current one expires. This method of password management is recommended when running scheduled, unattended backups since it ensures that the backup never fails because of an expired password. The default is *prompt*.

A utility program named `dsmcutil.exe` allows you to manage the password as stored in the registry. This utility program is distributed with the Tivoli Storage Manager backup-archive client package. For more information on using the `dsmcutil` program, see the `dsmcutil.hlp` file or the `dsmcutil.txt` file which are distributed with the Tivoli Storage Manager backup-archive client package.

CLUSTERnode

This option directs the Tivoli Storage Manager API and Data Protection for Exchange to be cluster-aware when running in a MSCS or VCS environment. This option *must* be specified for Data Protection for Exchange to function properly on a MSCS or VCS.

DEDUPLICATION

Client-side data deduplication is used by the Tivoli Storage Manager API, to remove redundant data during backup and archive processing before the data is transferred to the Tivoli Storage Manager server. Specify whether the Tivoli Storage Manager API deduplicates data before sending it to the Tivoli Storage Manager server. You can specify *Yes* or *No*. The default value is *No*. The value of the deduplication option for Data Protection for Exchange applies only if the Tivoli Storage Manager administrator allows client-side data deduplication.

The deduplication and *enablelanfree* options are mutually exclusive. You can use either one option or the other, but not both options together.

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

ENABLELANFree

This option allows Data Protection for Exchange to run in a LAN-free environment (if you are equipped to do so). To perform a LAN-free Legacy backup with Data Protection for Exchange, a Tivoli Storage Manager Storage Agent must be installed on the same machine and *enablelanfree yes* must be specified in the Data Protection for Exchange options file. To perform a LAN-free VSS Backup with Data Protection for Exchange, specify *enablelanfree yes* in the DSMAGENT (VSS Requestor) options file. See *Managed System for SAN Storage Agent User's Guide* for detailed information about LAN-free environments.

ENABLECLIENTENCRYPTKEY

This option encrypts Exchange databases during backup and restore processing. One random encryption key is generated per session and is stored on the Tivoli Storage Manager server with the object in the server database. Although Tivoli Storage Manager manages the key, a valid database must be available in order to restore an encrypted object. Specify *enableclientencryptkey yes* in the options file. In addition, assign the type of encryption to use by specifying the *encryptiontype* option in this same options file. You can specify *DES56* (56-bit) or *AES128* (128bit). The default is *AES128*. In this same file, you must also specify the databases you want encrypted by adding an include statement with the *include.encrypt* option.

- For Legacy backups, specify these encryption options in the Data Protection for Exchange options file.
- For VSS Backups, specify the encryption options in the backup-archive client options file that is used as the Local DSMAGENT Node. If the environment is configured for VSS offloaded backups, you must also specify the encryption options in the backup-archive client options file that is used as the Remote DSMAGENT Node. Review the encryption information available in the client documentation before attempting to encrypt your databases.

Perform the following tasks to encrypt your Exchange database Legacy backups:

1. Verify that you are running version 5.3.0 or later of the Tivoli Storage Manager server and Tivoli Storage Manager API.
2. Edit the options file for Data Protection for Exchange and add the following three options:
 - a. Add the *enableclientencryptkey yes* option.
 - b. Add the *encryptiontype* option with the type of encryption to use.
 - c. Add your include statements with the *include.encrypt* option. For example, to encrypt all Exchange data, specify the following:

```
include.encrypt *\...\*
```

To encrypt all the data in Storage Group 1, specify the following:

```
include.encrypt "SERVER_NAME\Storage Group 1\...\*"

```

COMPRESSION

This option instructs the Tivoli Storage Manager API to compress data before sending it to the Tivoli Storage Manager server; this reduces traffic and storage requirements. If you enable compression, it affects performance in two ways:

- CPU utilization is higher on the machine on which Data Protection for Exchange is running.
- Network bandwidth utilization is lower because fewer bytes are sent.
- Storage usage on the Tivoli Storage Manager server is reduced.

You may want to specify *compression yes* if any of the following conditions exist:

- The network adapter has a data overload.
- Communications between the Data Protection for Exchange and Tivoli Storage Manager server are over a low bandwidth connection.
- There is heavy network traffic.
- You can also use the *compressalways yes* option (with the *compression yes* setting) to specify that file compression continues even if the file grows as a result of compression.

It may be better to specify *compression no* in the following cases:

- The computer running Data Protection for Exchange has a CPU overload; the added CPU usage can impact other applications including the Exchange Server. You can monitor CPU and network resource utilization using the Performance Monitor program included with Windows.
- You are not constrained by network bandwidth; in this case, you can achieve the best performance by leaving compression NO and enabling hardware compaction on the tape drive, which also reduces storage requirements.

The Tivoli Storage Manager administrator can override the compression option setting for the Data Protection for Exchange node when registering or updating the node by specifying, on the Tivoli Storage Manager server side, that a particular node:

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

Considerations:

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

INCLUDE and EXCLUDE

Only use include and exclude statements to set policy for Legacy backups. Use the VSSPOLICY statement in the Data Protection for Exchange configuration file to set policy for VSS backups. See “Specifying Data Protection for Exchange preferences” on page 52 for more information.

A Data Protection for Exchange Legacy backup object name is composed of a series of qualifiers, each either an Exchange name or a Data Protection for Exchange constant, where the qualifiers are separated by a backslash (\). The general include and exclude syntax is:

```
include "objectNameSpecification" [ManagementClassName]
exclude "objectNameSpecification"
```

where objectNameSpecification is:

```
ExchangeServerName\ExchangeStorageGroupName\...\backupType
```

where backupType is one of the following:

```
full, copy, incr, diff, dbcopy
```

Note: The Tivoli Storage Manager API does not allow sending any of the three data types (meta, data, logs) that comprise an Exchange database backup to different storage destinations on the Tivoli Storage Manager server.

This example excludes Storage Group 1 from a backup:

```
EXCLUDE "SERVER1\Storage Group 1\...\*"
```

This example binds all objects for storage group SG2 to management class CLASS1:

```
INCLUDE "SERVER1\SG2\...\*" CLASS1
```

This example binds all Directory backups to management class CLASS2:

```
INCLUDE "SERVER2\Directory\...\*" CLASS2
```

This example binds all incremental objects to management class CLASS3:

```
INCLUDE "SERVER3\...\incr" CLASS3
```

This example binds mailbox history objects to management class CLASS4:

```
INCLUDE "\...\MAILBOXINFO\...\*" CLASS4
```

Consider the following behavior when setting *include* and *exclude* statements:

- The wildcard character (*) matches zero or more characters.
- The wildcard character (?) matches any one character.

- The wildcard character (*) within a qualifier replaces zero or more characters only within that qualifier. The qualifier itself must exist in the matching object name. To match zero or more qualifiers, use ellipses (\...\).
- Incremental object names are always unique. These names contain qualifiers whose values make them unique. Incremental object names are generated at the time of the backup and therefore are not predictable and cannot be specified.
- Include/exclude lists 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.
- When a match is found, processing of the list stops and the statement that matches is examined.
 - If it is an **exclude** statement, the matching object name is not backed up.
 - If it is an **include** statement, the matching object name is backed up.

If the **include** statement contains a `ManagementClassName`, that management class is associated with the object name, for this backup and for all backups of the same name on the current node.

- If a match is not found, the object is backed up using the default management class for the current node.
- If a match is found for an **include** statement that specifies a management class but the specified management class is not valid for the current node, the default management class for the current node is used.
- Exchange storage group names must be of the correct case, as shown by the displayed results from the **query exchange** or **query tsm**. Data Protection for Exchange constants must be lower case: `meta`, `data`, `logs`. However, at this time the Windows Tivoli Storage Manager API assumes the specifications are for a Windows file system and ignores case. Because they may be honored in the future, the correct case should always be used.

Note:

1. If you are running Data Protection for Exchange on a Microsoft Cluster Server or Veritas Cluster Server, the options file on all nodes of the cluster must be identical.
2. You can create additional Data Protection for Exchange options files to point to other Tivoli Storage Manager servers. You can also create more than one options file, each with different parameters, to use with a single Tivoli Storage Manager server.

Specifying Data Protection for Exchange preferences

Data Protection for Exchange configuration parameters are defined in the Data Protection for Exchange configuration file (tdpexc.cfg by default). These configuration parameters determine such preferences as the location of your log file, how date and time stamps display, and the number of buffers to use.

You can set the values of the Data Protection for Exchange configuration parameters by using the Data Protection for Exchange GUI or the command-line interface:

- In the MMC GUI, set the value in Properties.
- Use the **tdpexcc set** command in the Data Protection for Exchange command-line interface. See “Set command” on page 213.

Bind VSS backups to Tivoli Storage Manager policy by selecting **Properties -> VSS Policy Binding** in the GUI, and then entering appropriate values in the fields.

Chapter 3. Installing Data Protection for Microsoft Exchange Server

The information needed to install Data Protection for Exchange, including hardware and software requirements, is available in the topics listed.

Review the appropriate prerequisite information before installing Data Protection for Exchange.

Before you install Data Protection for Exchange, ensure that your system meets the minimum hardware, software, and operating system requirements. Details and functional requirements are available in the Hardware and Software Requirements technote that is associated with this release. For the *TSM for Mail - All Requirement Documents* website, see: <http://www.ibm.com/support/docview.wss?uid=swg21219345>.

Data Protection for Exchange is available in the following packages:

- Paid in Full: This package contains a license component and is a complete stand-alone release of the product. This procedure documents how to install the Paid in Full package.
- Program Temporary Fix (PTF): This package does not contain a license component. It is created to install over a previously installed version of Data Protection for Exchange. See the README.FTP file provided in the download directory where this package is accessed, for instructions regarding how to install the PTF package.

Software and operating system requirements

The minimum software and operating system requirements are dependent upon the Data Protection for Exchange operations you want to perform.

Details of the software and operating system requirements for Data Protection for Exchange can change over time. For current requirements, see the *TSM for Mail - All Requirements Documents* website, <http://www.ibm.com/support/docview.wss?uid=swg21219345>.

Available operations listed for Exchange Server versions

Table 13. Available operations listed for Exchange Server versions.

Operations	Exchange Server 2007	Exchange Server 2010
Legacy backup and restore	√	
Legacy restore into a Recovery Storage Group	√	
VSS Backup	√	√
VSS Restore	√	√
VSS Fast Restore	√	√
VSS Instant Restore	√	√
Mailbox restore and item-level restore	√	√

Table 13. Available operations listed for Exchange Server versions. (continued)

Operations	Exchange Server 2007	Exchange Server 2010
VSS Restore into a Recovery Storage Group or Recovery Database	✓	✓
VSS restore into an alternate storage group or database	✓	✓
VSS restore into a relocated storage group or database	✓	✓
VSS backup and restore of Local Continuous Replication (LCR) copies	✓	
VSS backup and restore of Cluster Continuous Replication (CCR) copies	✓	
VSS backup and restore of with Database Mobility and Availability Groups (DAG)		✓
Interactive mail item restore action using the Mailbox Restore Browser	✓	✓
Legacy and VSS restore to flat files using the restorefiles command	✓	✓

Minimum software and operating system requirements

The following operating systems are supported for a 64-bit system:

- 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 SP1, or later service pack levels, Standard x64, Enterprise x64, or Data Center x64 editions.

The following cluster environments are supported:

- Microsoft Windows Failover Clustering (previously MSCS).
- Veritas Cluster Server (VCS).

The following Microsoft Exchange versions are supported:

- Microsoft Exchange Server 2007.
- Microsoft Exchange Server 2010.

Hardware requirements

The minimum hardware requirements for Data Protection for Exchange are provided.

Before you install Data Protection for Exchange, ensure that your system has the minimum required hardware, software and operating system requirements. Details and functional requirements are available in the Hardware and Software Requirements technote that is associated with this release. For the *TSM for Mail - All Requirement Documents* website, see: <http://www.ibm.com/support/docview.wss?uid=swg21219345>.

Minimum hardware requirements

To install Data Protection for Exchange the hardware required is listed in this section.

Hardware for an x64 platform

Compatible hardware supported by the Windows operating system and Exchange Server

Virtualization support

Up-to-date information for virtualization environments supported by Data Protection for Exchange is available at the *IBM Tivoli Storage Manager (TSM) guest support for Virtual Machines and Virtualization* website: <http://www.ibm.com/support/docview.wss?uid=swg21239546>.

Quick installation and configuration of Data Protection for Exchange

Use the setup wizard to install Data Protection for Exchange. The wizard installs the base product code and prerequisites such as Report Viewer.

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

Follow these steps to install Data Protection for Exchange using the setup wizard:

1. Log on as an administrator.
 - a. Insert the IBM Tivoli Storage Manager for Mail Data Protection for Microsoft Exchange Server product DVD into your DVD drive. If autorun is enabled, the setup wizard starts automatically when the DVD loads. Otherwise, click **Start > Run** and at the prompt, specify `x:\setupfcm.exe`, where `x:` is your DVD drive. Click **OK**.
 - b. Follow the installation instructions that are displayed on the screen.
 - c. If prompted, restart your system before the installation completes.
 - d. Click **Finish** to complete the installation.
 - e. If you plan to use VSS operations, you must install the most recent version of the Tivoli Storage Manager backup-archive client. The backup-archive client is also the VSS Requestor and is available separately.

Note: The default installation directory is `C:\Program Files\Tivoli`. If another Tivoli Storage Manager product is already installed to a user-specified location,

the installation wizard will use that location as the default installation directory. Install all Tivoli Storage Manager products and components into the same base directory.

2. If you are installing Data Protection for Exchange in a Microsoft Windows Failover Clustering environment or Veritas Cluster Server environment, repeat the installation procedure on all nodes of your cluster.
3. Configure Data Protection for Exchange using the configuration wizard.
 - a. Start the Management Console by clicking **Start > All Programs > Tivoli Storage Manager > Data Protection for Microsoft Exchange Server > DP for Exchange Management Console**. If you have not previously configured Data Protection for Exchange, the configuration wizard starts automatically.
 - b. If the configuration wizard does not start automatically, click **Manage > Configuration > Wizards** in the tree view, select the wizard, and click **Start** in the Actions pane.
 - c. Complete the following pages of the wizard:

Data Protection Selection

Select **Exchange Server** as the application to protect.

Requirements Check

Click any **Failed** or **Warnings** links for help on resolving potential issues.

TSM Node Names

Enter the Tivoli Storage Manager server node name that is used by Data Protection for Exchange. If you are using VSS, enter the VSS Requestor node name.

TSM Server Settings

Specify the Tivoli Storage Manager server address, and select whether to have the wizard configure the Tivoli Storage Manager server.

Custom Configuration

Click **Default** in most situations, or click **Custom** to enter all service name information.

TSM Configuration

Wait for all components to be provisioned and configured. Click **Re-run** if there are any problems. Click the **Failed** or **Warnings** links for more information if any problems remain.

Completion

This page shows the status of the configuration. If you are using Windows Server 2008 or later, and you plan to use VSS operations, check the **VSS Diagnostics** check box to begin VSS verification.

Attention: If you did not choose to configure the Tivoli Storage Manager server, the Tivoli Storage Manager administrator must configure the Tivoli Storage Manager server before verification can be done. If the wizard does not configure the Tivoli Storage Manager server, a link to a macro is made available to the Tivoli Storage Manager administrator to configure the Tivoli Storage Manager server.

- d. Use the Tivoli Storage Manager configuration wizard to select the applications that you would like to protect. Use it to verify requirements, provision, and configure the components required to support the selected applications. Each warning has a link to a website where you can download hotfixes or packages for the successful completion of the configuration

process. After the configuration process completes successfully, you will be able to protect and manage your application data.

4. If you plan to run VSS backups in order to create and manage persistent snapshots, install the backup-archive client.
5. Verify the configuration:
 - a. If you are using VSS operations, verify that VSS is working correctly.
If the **VSS Diagnostics** checkbox was selected in the last step of the configuration wizard, the VSS Diagnostics wizard opens. You can also start this wizard by clicking **Manage > Diagnostics**, and clicking **VSS Diagnostics** in the Actions pane.

Complete the following pages in the VSS Diagnostics wizard:

Snapshot Volume Selection

Select the volumes that you want to test, and review the VSS provider and writer information.

VSS Snapshot Tests

Review event log entries that are logged as the persistent and non-persistent snapshots are taken, and resolve any errors.

Completion

Review the test status and click **Finish**.

- b. Verify that Data Protection for Exchange is configured properly:
 - 1) Click the **Automate** tab to open the integrated command-line interface.
 - 2) At the bottom part of the window, click the Open folder icon, and select the `verify_exc.txt` file. Then click **Open**.
 - 3) These commands are displayed in the command-line panel:

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

Press **Enter** to run the commands to verify your configuration. The configuration is verified as correct when these commands run without warnings or errors.
 - 4) When verification is complete, you can use Data Protection for Exchange to back up and restore Exchange server data.
6. Back up and restore a set of test data.
7. Customize your Data Protection for Exchange policy settings and scheduled operations to ensure that your business requirements are satisfied.

For information regarding language packs, see “Installing and activating the language packs.” For information regarding manual configuration tasks, see Chapter 4, “Configuring Data Protection for Exchange,” on page 67.

Installing and activating the language packs

Each language pack contains language-specific information for the Data Protection for Exchange Management Console, command-line output, and messages. The installation wizard automatically identifies the language of your geography, and loads the language pack for that language.

Installing additional language packs

To view the Data Protection for Exchange Management Console, command-line, and messages in a language other than your local language, install the an additional language pack from the product DVD.

When installing the language pack on a computer that supports a language other than English, the setup program starts automatically. The configuration wizard automatically provisions a language pack for any component that it provisions.

Follow these steps to install an additional language pack:

1. Insert the IBM Tivoli Storage Manager for Mail Data Protection for Microsoft Exchange Server product DVD into the DVD drive and select **Run** from the **Start** menu.
2. Navigate to the appropriate directory, and run the following commands:
 - For Data Protection for Exchange Management Console language packs:
x:\fcm\aaa\mmc\3100\bbb\setup.exe
 - For Data Protection for Exchange Language Packs: x:\fcm\aaa\mmc\3100\bbb\setup.exeWhere x: is the DVD drive, aaa is x86 or x64, and bbb is the three-letter country code associated with the language that you are installing.
3. Follow the installation instructions in the prompt windows.
4. Click **Finish** to complete the installation.

Activating the language packs

After installing the language pack, activate the language by updating the Data Protection for Exchange configuration file (tdpexc.cfg by default) using either of these methods:

- Use the **set** command with the *language* parameter to specify the selected language, for example:
tdpexcc set lang=fra

See “Set positional parameters” on page 214 for a description of the *language* parameter and a list of available languages with their three-letter country codes.

- Use the configuration editor in the Data Protection for Exchange Management Console by selecting **Edit**→**Configuration**→**Regional**→**Language**. The Management Console configuration editor shows the installed languages in their long form. For example:
English (United States)

Use the Property pages to set the language using these steps:

1. Select the Exchange server instance in the tree view.
2. Click **Properties** in the Actions pane.
3. Select the **Regional** property page.
4. Click **Regional and Language Options** to ensure that system settings match the language that you want to use. The MMC Management Console uses system language settings.
5. Select the language from the list of installed language packs. The components use language settings from the Data Protection for Exchange configuration file (tdpexc.cfg).

6. For best results, select the language that matches the system settings. Click **Match MMC language** to automatically update the language to match the system.

Silent installation

A silent installation runs on its own without any user interaction, and is considered unattended. Administrators can install Data Protection for Exchange using silent installation.

Silent installation is useful when Data Protection for Exchange must be installed on a number of different computers with identical hardware. For example, a company may have 25 Exchange Servers spread out across 25 different sites. To ensure a consistent configuration and to avoid having 25 different people enter Data Protection for Exchange parameters, an administrator may choose to produce an unattended install and make it available to the 25 sites by cutting and sending out 25 DVDs or by placing the unattended install package on a file server.

Windows 2008 systems: The User Account Control feature in Windows 2008 does not support silent installations. To install the product silently with the **Setup Program** or **Microsoft Installer (MSI)**, use one of these two methods:

- Run from a manageability tool such as Tivoli.
- Run from an elevated command line.

Tip: Details of prerequisites are included in the *TSM for Mail - All Requirement Documents* at <http://www.ibm.com/support/docview.wss?uid=swg21219345>.

You can perform a silent installation on using one of the following methods:

Setup Program

Use the **setup** command with the command-line invocation and special silent installation options.

Microsoft Installer (MSI)

Use **msiexec.exe** to install the MSI package.

The following options can be used with both silent installation methods.

Table 14. Silent installation options

Option	Description
<i>/i</i>	Specifies the program is to install the product.
<i>/l*v</i>	Specifies verbose logging.
<i>/qn</i>	Runs the installation without running the external user interface sequence.
<i>/s</i>	Specifies silent mode.

Table 14. Silent installation options (continued)

Option	Description
<i>/v</i>	Specifies the Setup Program to pass the parameter string to the call it makes to the MSI executable file (msiexec.exe). The following syntax requirements apply when invoking the <i>/v</i> option: <ul style="list-style-type: none"> • A backslash (\) must be placed in front of any quotation marks (" ") that reside within existing quotation marks. • Do not include a space between the <i>/v</i> command-line option and its arguments. • Multiple parameters entered with the <i>/v</i> command line option must be separated with a space. • You can create a log file by specifying the directory and filename at the end of the command. The directory must already exist at the time a silent installation is performed.
<i>/x</i>	Specifies the program is to uninstall the product.
<i>addlocal</i>	Specifies features to install.
<i>allusers</i>	Specifies which users can use the installation package.
<i>installdir</i>	Specifies the directory where Data Protection for Exchange is to be installed.
<i>reboot</i>	Specifies whether or not to prompt the user to reboot the system after silent installation. <ul style="list-style-type: none"> • <i>Force</i> Always prompts user to reboot after silent installation. • <i>Suppress</i> Suppress prompt to reboot after silent installation. • <i>ReallySuppress</i> Suppress all reboots and prompts to reboot after silent installation.
<i>rebootyesno</i>	Specifies whether or not to restart the system after a silent installation. Specify <i>Yes</i> to restart the system after silent installation. Specify <i>No</i> not to restart the system after silent installation.
<i>transforms</i>	Specifies language to install.

The following features are used in this procedure and are case sensitive.

Table 15. Silent installation features (base client only)

Feature	Description
Client	Data Protection for Exchange code

Table 16. Silent installation features (Language Packages only)

Feature	Description
LanguageFiles	Language specific files

Table 17. Silent installation features (IBM Tivoli Storage FlashCopy Manager)

Feature	Description
Plug-in	IBM Tivoli Storage Manager (enables LOCAL VSS operations, and offloaded VSS backups)

The following transforms are used in this procedure.

Table 18. Silent installation transforms

Transform	Language
1028.mst	CHT Chinese (Traditional)
1029.mst	CSY Czech ¹
1031.mst	DEU German
1033.mst	ENG English
1034.mst	ESP Spanish
1036.mst	FRA French
1038.mst	HUN Hungarian ¹
1040.mst	ITA Italian
1041.mst	JPN Japanese
1042.mst	KOR Korean
1045.mst	PLK Polish ¹
1046.mst	PTB Portuguese Brazilian
1049.mst	RUS Russian ¹
2052.mst	CHS Chinese (Simplified)

¹ This language support does not apply to Data Protection for Exchange. Language support is for the following components only:

- IBM Tivoli Storage Manager
- IBM Tivoli Storage Manager for Copy Services.

Installing with the setup executable

Use the setup program `setup.exe` to silently install Data Protection for Exchange.

Data Protection for Exchange must be installed from a local Administrator group account for the machine on which the Exchange server is running. There are two components to be installed that are available on the product DVD:

DP for Exchange Management Console

- 32-bit `x:\fcm\x86\mmc\3100\enu\setup.exe`
- 64-bit `x:\fcm\x64\mmc\3100\enu\setup.exe`

Data Protection for Exchange Server

- 32-bit `x:\fcm\x86\exc\3100\enu\setup.exe`
- 64-bit `x:\fcm\x64\exc\3100\enu\setup.exe`

Additional language packs can be loaded onto the machine as listed in Table 16 on page 60.

To run a silent installation of Data Protection for Exchange:

1. Run these commands to silently install both components to the default installation directories:

```
x:\fcm\aaa\mmc\3100\enu\setup.exe /s /v/qn
x:\fcm\aaa\sql\6300\enu\setup.exe /s /v/qn
```

Where x: is the DVD drive and aaa is either x64 or x86.

This is an example of commands that specify the target directory, features, language transform, boot suppression, and logging. Each command should be input on a single line.

```
x:\fcm\x64\mmc\3100\enu\setup.exe /s /v"INSTALLDIR=\"C:\Program Files\Tivoli\"
ADDLOCAL=\"Client\" TRANSFORM=1033.mst REBOOT=ReallySuppress /qn /l*v
\"C:\Temp\DpExcMmcSetupLog.txt\"
x:\fcm\x64\exc\6300\enu\setup.exe /s /v"INSTALLDIR=\"C:\Program Files\Tivoli\tsm\"
ADDLOCAL=\"Client\" TRANSFORM=1033.mst REBOOT=ReallySuppress /qn /l*v
\"C:\Temp\DpExcSetupLog.txt\"
```

Note:

1. You must place a backslash (\) before each quotation mark that is within an outer set of quotation marks (").
2. This example shows a one line command, press enter only when all the details have been entered.
3. You must place quotation marks (") around the following:
 - A directory path that contains spaces.
 - An argument that specifies multiple features. Although quotation marks are needed around the complete argument, you must still place a backslash before each internal quotation mark.
4. All features listed in a custom installation must be listed after the *addlocal* option.

Creating batch files

A batch file can be created to begin silent install with specified parameters.

This is a sample script (c:\setup.bat) to demonstrate unattended installation:

```
@echo off
rem =====
rem sample silent install script
rem
call x:\fcm\x64\mmc\3100\enu\setup.exe /s
/v"INSTALLDIR=\"C:\Program Files\Tivoli\" ADDLOCAL=\"Client\" TRANSFORM=1033.mst
REBOOT=ReallySuppress /qn /l*v \"C:\Temp\DpExcMmcSetupLog.txt\"
rem
call x:\fcm\x64\exc\6300\enu\setup.exe /s
/v"INSTALLDIR=\"C:\Program Files\Tivoli\tsm\" ADDLOCAL=\"Client\"
TRANSFORM=1033.mst REBOOT=ReallySuppress /qn /l*v \"C:\Temp\DpExcSetupLog.txt\"
rem =====
rem code could be added after the
rem installation completes to
rem customize the dsm.opt files
rem if desired
rem =====
```

Installing with MSI

Use the Microsoft Installer program `msiexec.exe` to silently install Data Protection for Exchange.

Data Protection for Exchange must be installed from an account that is a member of the local Administrators group for the machine on which the Exchange server is running.

Attention: Installing with `msiexec.exe` does not install any system prerequisites. When using `msiexec.exe`, you must install all prerequisites manually.

For current requirements and prerequisites, see the *TSM for Mail - All Requirements Documents* website at, <http://www.ibm.com/support/docview.wss?uid=swg21219345>.

- For the Data Protection for Exchange Management Console, install the following prerequisites:

Microsoft .NET Framework 4 Client Profile

x:\fcm\x64\mmc\3100\enu\ISetupPrerequisites\{29FC0BB0-95A7-4420-B46C-68F628FB5FC4}\dotNetFx40_Client_x86_x64.exe

32-bit Microsoft Visual C++ 2010 Redistributable Package

x:\fcm\x64\mmc\3100\enu\ISetupPrerequisites\{270b0954-35ca-4324-bbc6-ba5db9072dad}\vc_redist_x86.exe

64-bit Microsoft Visual C++ 2010 Redistributable Package

x:\fcm\x64\mmc\3100\enu\ISetupPrerequisites\{7f66a156-bc3b-479d-9703-65db354235cc}\vc_redist_x64.exe

Microsoft ReportViewer 2010 SP1 Redistributable

x:\fcm\x64\mmc\3100\enu\ISetupPrerequisites\{E79DF561-C1FA-48ED-9BB0-6C9DC84ABAAE}\ReportViewer.exe

This is an example of the Data Protection for Exchange silent installation command. You must substitute the appropriate `.msi` package filename and Language Package feature when installing a language other than English, see Table 16 on page 60. This example silently installs Data Protection for Exchange to a directory other than the default installation directory and includes custom features:

```
msiexec /i
"IBM Tivoli Storage Manager for Mail - MS Exchange.msi"
RebootYesNo="No" Reboot="Suppress" ALLUSERS=1
INSTALLDIR="c:\program files\tivoli\tsm"
ADDLOCAL="Client,License_Paid"
TRANSFORMS=1033.mst /qn /l*v "c:\temp\log.txt"
```

Note:

- You must place quotation marks (") around the following:
 - A directory path that contains spaces.
 - An argument that specifies multiple features. Although quotation marks are needed around the complete argument, you must still place a backslash before each internal quotation mark.
- This example shows a one line command, press enter only when all the details have been entered.
- All features listed in a custom installation must be specified after the *addlocal* option.

Installation problems: capturing a log of the installation

In the event of a silent installation failure, gather the installation information details to assist IBM Software Support when evaluating your situation. You can create a detailed log file of the failed installation that can facilitate analysis of your situation.

The following environmental information can be helpful:

- Operating system level
- Service pack
- Hardware description
- Install package (DVD or electronic download) and level
- Any Windows event log that is relevant to the failed install
- Other Windows services active at the time of the install (e.g. antivirus software)

Before contacting support, check for the following items:

- You are logged on to the local machine console (not through a terminal server).
- You are logged on as a local administrator, not a domain administrator.

Cross-domain installations are not supported.

Assuming that all looks correct, gather a detailed log of the failing install into a file called `setup.log`. To generate a log file ensure that `/l*v \"filename\"` is used on the command-line interface. For example, issue the following command (on a single line) to generate a log file named `C:\Temp\DpExcSetupLog.txt`:

```
x:\fcm\x64\exc\6300\enu\setup.exe /s /v"INSTALLDIR=\"C:\Program
Files\Tivoli\tsm\" ADDLOCAL=\"Client\" TRANSFORM=1033.mst
REBOOT=ReallySuppress /qn /l*v \"C:\Temp\DpExcSetupLog.txt\""
```

Creating the package on a DVD or a file server

Refer to this information when creating a silent install package on a DVD or a file server.

The administrator has a choice of making the package available in different ways, including burning a DVD or placing the package in a shared directory on a file server. Typically, the package contains the Data Protection for Exchange code distribution files and a batch file for silent install.

Creating a silent installation package

Refer to these command examples when creating a silent installation package.

First you will need to choose a location for the package. If you are burning a DVD, it is convenient to use a staging directory. If you are placing the package on a file server, you can use a staging directory or you can build the package directly on the file server. The following example uses `c:\tdpdpkg` as a staging directory. It is recommended that you check that you have enough free space in the staging directory for the package before you start. The following commands can be issued to create the package:

Command	Description
<code>mkdir c:\tdpdpkg</code>	– Create a staging directory for the silent install package
<code>dvd /d c:\tdpdpkg</code>	– Go to the staging directory
<code>xcopy g:*.* . /s</code>	– Copy the Data Protection for Exchange DVD distribution files to the staging directory

Command	Description
copy c:\setup.bat	– Replace the existing setup.bat with the one created in the previous step

At this point, the silent install should be tested. When testing is complete, the package can be placed on DVD or it can be made available from a shared directory.

Playing back the silent installation

After the package is available on DVD or from a shared directory, it can be played back (run) on another machine. No visual cues exist to inform you when the installation has finished, although this could be added in the batch file.

Allow enough time for the unattended setup to complete.

From a silent install package on DVD: If autostart is enabled, the silent install begins as soon as the DVD is inserted into the drive. If autostart is not enabled, the silent install can be run by issuing the setup.bat file from the root of the DVD.

```
cd /d g:\
setup.bat
```

From a distribution directory: If the package was placed in a shared directory called tdppkg located at \\machine1\d\$, another computer could execute the command: net use x: \\machine1\d\$ to share the drive as drive x. The following command could then be issued:

```
cd /d x:\tdppkg
setup.bat
```

In either case the silent install begins.

Setup error messages

The setup.exe program may produce error messages if it cannot start properly. In most cases you will encounter these messages when a severe error occurs. Rarely will your users see these messages. When you get an error message, it appears in a message box.

Every error message has a number. These are system error messages and there is no way to suppress them in your script.

If you encounter an error you can go to the InstallShield support website at: <http://support.installshield.com/default.asp>, and use the Search facility to obtain information on the error.

Chapter 4. Configuring Data Protection for Exchange

Configuration requirements for Data Protection for Exchange, Tivoli Storage Manager, and other applications will vary, depending on which Data Protection for Exchange features you want to use. If you plan on using VSS operations, the Tivoli Storage Manager VSS Requestor must be installed and configured.

When you have successfully run the setupfcm.exe wizard, you can begin the configuration.

1. Start the Management Console by clicking **Start > All Programs > Tivoli Storage Manager > Data Protection for Microsoft Exchange Server > DP for Exchange Management Console**.
2. If the configuration wizard does not start automatically, start it by selecting the **Manage** node in the tree view and then selecting **Configuration > Wizards**.
3. Select the configuration wizard and click **Start** in the Actions pane.
4. Enter the requested information on each wizard page, and complete the wizard.
5. If any warnings or error links appear, click them to get information about how to resolve the issues.

Note: If you plan to automate your backup operations using the Tivoli Storage Manager central scheduler, the Tivoli Storage Manager backup-archive client scheduler must also be installed and configured.

Verify the configuration by following these steps:

1. Click on the Automate tab to access the integrated command-line interface.
2. On the bottom half of the screen, click on the Open folder icon, and select the `verify_exc.txt` file.
3. Click Open. These commands appear in the command-line panel:

```
query tdp
query tsm
query exchange
```
4. With the cursor in the command-line panel, press Enter to run the commands to verify your configuration.

Follow steps 1 - 5 on the system that has the Exchange server installed to manually configure Data Protection for Exchange:

“1. Perform these tasks on the machine running the Exchange Server” on page 68,

“2. Perform these tasks on the Tivoli Storage Manager server” on page 69,

“3. Perform these tasks on the machine running the offloaded backups” on page 70

“4. Perform these tasks to configure your system for mailbox-level and item-level restore operations” on page 71

“5. Perform these tasks to verify your configuration” on page 71

1. Perform these tasks on the machine running the Exchange Server

Make sure that the Exchange Server is running before performing this task.

Perform these steps on the machine where the Exchange Server is installed and running:

1. (Legacy only) Specify your Data Protection for Exchange node name and communication method in the `dsm.opt` file located (by default) in the Data Protection for Exchange installation directory. Additional options are also available.

For additional information see “Specifying Data Protection for Exchange options” on page 47.

2. (Legacy only) Using the **set** command, specify your Data Protection for Exchange preferences (language, date format, log file) in the `tdpexc.cfg` file located in the Data Protection for Exchange installation directory.

See “Specifying Data Protection for Exchange preferences” on page 52 and “Set positional parameters” on page 214 for additional information.

3. (VSS Only): Specify your VSSPOLICY statement in your Data Protection for Exchange configuration file.

See “Specifying Data Protection for Exchange preferences” on page 52 and “Set positional parameters” on page 214 for additional information.

4. (VSS Only): Configure the Tivoli Storage Manager backup-archive client (if it is not already configured). If the backup-archive client is already configured, you can use existing client services. The backup-archive client setup wizard guides you through the configuration process. In the backup-archive client GUI menu, click **Utilities->Setup Wizard->Help me configure the TSM Backup Archive Client**. The node name for this machine is called the Local DSMAGENT Node, and is specified with the `localdsmagentnode` parameter in the Data Protection for Exchange configuration file (`tdpexc.cfg`).

For additional information see “Proxy node definitions (VSS Backups)” on page 44 *IBM Tivoli Storage Manager for Windows Backup-Archive Client Installation and User's Guide*.

5. (VSS Only): Install and configure the Tivoli Storage Manager Client Acceptor Daemon (CAD) Service if it is not already installed and configured. In the backup-archive client GUI menu, click **Utilities->Setup Wizard->Help me configure the TSM Web Client**. Make sure that the CAD service is running before proceeding to Step 6.
6. (VSS Only): Install and configure the Tivoli Storage Manager Remote Client Agent Service (DSMAGENT) if it is not already installed and configured. In the backup-archive client GUI menu, click **Utilities->Setup Wizard->Help me configure the TSM Web Client**. You can use the existing DSMAGENT if one is already installed and configured.
7. (VSS Only): If you want to manage local persistent VSS snapshots, including VSS backups to LOCAL, VSS Instant Restores, and offloaded backups, you must install IBM Tivoli Storage FlashCopy Manager.
8. (VSS Only): Add the Microsoft Exchange Server binary path to the PATH statement in the system environment variables. For example:

"C:\Program files\Exchsrvr\bin"

Verify that ESEUTIL.EXE tool exists in this directory. This tool is used by Data Protection for Exchange to run automatic integrity checks on the VSS backup.

9. **(VSS Only):** Install and configure a VSS provider. Consult the VSS provider documentation for information regarding configuration of that software. There is no installation or configuration required if you are using the default Windows VSS System Provider.
10. **(VSS Only):** Define storage space to contain VSS Backups that will reside on local shadow volumes. Make sure you define enough space to contain all copies of the VSS Backups as designated by your policies. Provisioning storage space to manage VSS snapshots is dependent on the VSS provider that you use. Consult the VSS Provider documentation for more details.
See “Back up to Tivoli Storage Manager storage versus back up to local shadow volumes” on page 38 for recommendations regarding sufficient disk storage space.

2. Perform these tasks on the Tivoli Storage Manager server

Make sure that Tivoli Storage Manager server is available before performing this task.

Perform these steps on the Tivoli Storage Manager server:

1. Define the policy domains, policy sets, management classes, copy groups, and storage pools needed to meet your Data Protection for Exchange backup and restore requirements. For VSS operations, Tivoli Storage Manager server authentication must be on.
2. Register your Data Protection for Exchange node name and password with the Tivoli Storage Manager **register node** command. For example, this node is the target node for VSS operations. When registering nodes to the Tivoli Storage Manager server specifically for VSS operations, do not specify the Tivoli Storage Manager **USeid**=NONE parameter. VSS operations fail when this parameter is specified.
3. (VSS only) If not already defined, register your Tivoli Storage Manager backup-archive client node name and password for the machine where the Exchange Server is installed. For example, this agent node is the Local DSMAGENT Node for VSS operations.
4. (VSS only) If you plan to run offloaded backups from a particular machine, first register the Tivoli Storage Manager backup-archive client node name and password for the machine. For example, the agent node is the Remote DSMAGENT Node. **BAOFF** is used in this example (and in Step 5) to differentiate between this Remote DSMAGENT Node and the Local DSMAGENT Node (Step 3). You can replace **BAOFF** with the node name of your backup-archive client, and remove the **BAOFF** from the **grant proxynode** command.
5. (VSS only) Define the proxy node relationship (for the Target Node and agent nodes) with the Tivoli Storage Manager **grant proxynode** command. For example:

```
grant proxynode target=DP agent=BAnodename,BAOFF
```

Note: Always complete and fix any warnings that are identified during the configuration process. Some warnings have a link to a macro that you can use to configure the Tivoli Storage Manager, others have links to websites where you can download the packages you need to complete the configuration successfully.

Related concepts

"How Tivoli Storage Manager server policy affects Data Protection for Exchange" on page 29

"Data Protection for Exchange node name: recommended settings" on page 44

Related information

"Recommended Tivoli Storage Manager policy settings" on page 41

"Proxy node definitions (VSS Backups)" on page 44

3. Perform these tasks on the machine running the offloaded backups

This task is for VSS operations only.

Run these steps on the machine running the offloaded backups:

1. Configure the Tivoli Storage Manager backup-archive client (if it is not already configured). If the backup-archive client is already configured, you can use existing client services. In the backup-archive client GUI menu, click **Utilities->Setup Wizard->Help me configure the TSM Backup Archive Client**. The node name for this machine is called the Remote DSMAGENT Node and is specified with the *remotedsmagentnode* parameter in the Data Protection for Exchange configuration file (tdpexc.cfg).
2. Install and configure the Tivoli Storage Manager Client Acceptor Daemon (CAD) Service and the Remote Client Agent Service (DSMAGENT) if they are not already installed. You can use an existing client CAD Service if one is already installed and configured. Use the backup-archive client Setup Wizard to guide you through the CAD installation process by clicking **Utilities->Setup Wizard->Help me configure the TSM Web Client**.
3. Install the Microsoft Exchange Server management tools from the Microsoft Exchange Server installation media. Take note of the Microsoft Exchange Server Management tools binary directory (for example: C:\Program files\Exchsrvr\bin). Verify that the ESEUTIL.EXE tool exists in this directory. Data Protection for Exchange uses this tool to run automatic integrity checking of the VSS backup.

Note:

- a. The Exchange Server does not need to be installed or running on this machine. Only the Microsoft Exchange Server management tools are required to be installed on this machine.
 - b. See your Microsoft Exchange Server documentation for necessary license requirements.
4. Add the Microsoft Exchange Server binary path to the PATH statement in the system environment variables. For example:
"C:\Program files\Exchsrvr\bin"
 5. Install and configure a VSS provider (if you are not using the default system VSS provider). Consult the VSS provider documentation for information regarding configuration of that software.

4. Perform these tasks to configure your system for mailbox-level and item-level restore operations

To use the Data Protection for Exchange mailbox restore feature, there are additional configuration steps that the configuration wizard addresses.

Because of an Exchange Server requirement, the Data Protection for Exchange configuration wizard checks the Microsoft Exchange Server MAPI Client and Collaboration Data Objects (MAPI) versions on the Exchange Server from which you are running the mailbox restore. If the incorrect version is used, a warning is displayed with a link to a site where you can download the correct version.

The Client Access Server Role must also be configured to run Mailbox Restore operations on Exchange Server 2010. Consult your Microsoft documentation for further details.

Restriction: Do not manually install the Microsoft Outlook MAPI on any Exchange Server machine that is used to perform Data Protection for Exchange mailbox restore tasks. Microsoft does not recommend installing the Microsoft Outlook MAPI with the Exchange Server. Consult your Microsoft documentation for further details.

5. Perform these tasks to verify your configuration

Before attempting to perform a backup or restore operation, verify that Data Protection for Exchange is installed and configured correctly.

Verifying the configuration from the integrated command-line

1. Click on the Automate tab to access the integrated command-line interface.
2. On the bottom half of the screen, click on the Open folder icon, and select the `verify_exc.txt` file.
3. Click Open. These commands appear in the command-line panel:

```
query tdp
query tsm
query exchange
```
4. With the cursor in the command-line panel press Enter to run the commands to verify your configuration.

The Data Protection for Exchange server configuration is verified as correct when these commands complete without errors or warnings.

Verifying the Exchange Server is ready to perform VSS operations

Complete the following tests to verify that your Exchange Server is ready to perform VSS operations. For best results, complete these tests before installing Tivoli Storage Manager.

When these tests complete without errors, you can install Tivoli Storage Manager. For Windows 2003, download the VShadow tool before issuing the **VSHADOW** command. For Windows 2008 and later, the DiskShadow tool is preinstalled.

Note: On the last step of the configuration wizard, a VSS diagnostic check is run to verify the VSS setup. Any warnings should be fixed before you finish the configuration and start a Data Protection for Exchange operation.

Using the VSHADOW command

1. Test the creation and the deletion of a non-persistent shadow copy:
 - a. From the command line, issue the Microsoft Windows VSHADOW command:

```
VSHADOW k: l:
```

The variable "k:" is the Exchange Server database volume and the variable "l:" is the Exchange Server log volume.

- b. Repeat the preceding step four times.
 - c. Verify that the Windows Event Log contains no errors.
2. Test the creation and the deletion of a persistent shadow copy:
 - a. From the command line, issue the Microsoft Windows VSHADOW command:

```
VSHADOW -p k: l:
```

The variable "k:" is the Exchange Server database volume and the variable "l:" is the Exchange Server log volume.

Important: If you do not have enough space to run the command, you might want to delete shadow copies on the server. To delete *all* shadow copies on a server, issue the Microsoft Windows VSHADOW command: VSHADOW -da

- b. Repeat the preceding step four times.
 - c. Verify that the Windows Event Log contains no errors.
3. If you plan to run offloaded VSS Backups, test the creation and the deletion of a non-persistent transportable shadow copy (VSS Hardware Provider environments only):

- a. From the command line, issue the Microsoft Windows VSHADOW command:

```
VSHADOW -t=export.xml k: l:
```

The variable "k:" is the Exchange Server database volume and the variable "l:" is the Exchange Server log volume.

- b. On the server that you have designated for offloaded backup, from a command-line prompt, issue the Microsoft Windows VSHADOW command as follows:

```
VSHADOW -i=export.xml
```

- c. Verify that the Windows Event Log contains no errors.

Using the DISKSHADOW command (Windows 2008 and later)

Before installing Data Protection for Exchange, it is highly recommended that you test core VSS functionality first. VSS functionality can be validated with the Windows 2008 Server-embedded command DISKSHADOW. DISKSHADOW is available for Windows Server 2008 and Windows Server 2008 R2. The following are the DISKSHADOW tests that are recommended before any Tivoli Storage Manager components are installed.

1. Test non-persistent shadow copy creation and deletion.
 - Run DISKSHADOW in a command window
 - DISKSHADOW>begin backup
 - DISKSHADOW>add volume f: (Database volume)
 - DISKSHADOW>add volume g: (Log volume)

- DISKSHADOW>create
- DISKSHADOW>end backup
- DISKSHADOW>list shadows all (this may take a few minutes)
- DISKSHADOW>delete shadows all

Note: Volumes *f:* and *g:* represent the Exchange Database and log volumes. Repeat this four times, and verify the Windows Event Log contains no errors.

2. Test Persistent shadow copy creation and deletion.

- Run DISKSHADOW on a command window
- DISKSHADOW>set context persistent
- DISKSHADOW>begin backup
- DISKSHADOW>add volume *f:* (Database volume)
- DISKSHADOW>add volume *g:* (Log volume)
- DISKSHADOW>create
- DISKSHADOW>end backup
- DISKSHADOW>list shadows all (This may take a few minutes)
- DISKSHADOW>delete shadows all

Note: Volumes *f:* and *g:* represent the Exchange Database and log volumes. Repeat this four times, verify the Windows Event Log contains no errors.

3. Test Non-persistent transportable shadow copy creation and deletion.

- Run DISKSHADOW on a command window
- DISKSHADOW>set context persistent
- DISKSHADOW>set option transportable
- DISKSHADOW>begin backup
- DISKSHADOW> add volume *f:* (Database volume)
- DISKSHADOW> add volume *g:* (Log volume)
- DISKSHADOW>set metadata *c:\metadata\exchangemeta.cab* (specify the path where you want the metadata stored)
- DISKSHADOW> create
- DISKSHADOW>end backup
- Manually copy the *exchangemeta.cab* file from the source server to the offload server and run these two commands:
 - DISKSHADOW>LOAD METADATA *path to exchangemeta.cab*
 - DISKSHADOW>IMPORT
 - DISKSHADOW>list shadows all (This may take a few minutes)
 - DISKSHADOW>delete shadows all

Note: Volumes *f:* and *g:* represent the Exchange Database and log volumes. Repeat this four times, and verify the Windows Event Log contains no errors.

After the tests complete satisfactorily, you can install Tivoli Storage Manager components.

Diagnose the cause of common errors returned from VSS operations

Note that the following two errors are commonly returned when performing a VSS operation. Information is provided to help locate the cause of the error.

ANS1017E (RC-50) Session rejected: TCP/IP connection failure

This is displayed when the Tivoli Storage Manager backup-archive client CAD is either not running or is not configured properly.

ANS1532E (RC5722) Proxy Rejected: Proxy authority has not been granted to this node. This is displayed when the Tivoli Storage Manager server has not been configured for the proxy nodes correctly.

Chapter 5. Legacy quick configuration (Exchange Server 2007)

This section provides instructions on how to perform a quick install, configuration, and Legacy back up of a storage group using the Data Protection for Exchange console. This procedure applies to Exchange Server 2007 only.

If you plan to perform VSS operations, you must follow configuration instructions provided in Chapter 4, “Configuring Data Protection for Exchange,” on page 67. It minimizes setup time and allows you to proceed quickly to a state where you can begin backing up your Exchange storage groups. See Chapter 4, “Configuring Data Protection for Exchange,” on page 67 for detailed instructions on how to customize Data Protection for Exchange for your environment and processing needs.

1. Install Data Protection for Exchange from an account that is a member of the local Administrators group for the machine on which the Exchange server is running.
 - Detailed installation instructions are available in “Quick installation and configuration of Data Protection for Exchange” on page 55.
2. In the Program Files\Tivoli\TSM\TDPEExchange directory, edit this dsm.opt file with the following options:
 - **nodename**: Specify the nodename of the machine where Data Protection for Exchange is installed. This is the unique name by which the Tivoli Storage Manager server recognizes your machine.
 - **tcpserveraddress**: Specify the TCP/IP address of the Tivoli Storage Manager server to which you will back up your Exchange databases. You can specify the address as a domain name (server.xyz.company.com) or a dot address (10.100.23.5).
3. Start the Data Protection for Exchange GUI by selecting **Start->Programs->Tivoli Storage Manager->Data Protection for Exchange->Exchange Client Console**.
4. Expand the **Manage** node in the navigation pane, and click **Configuration -> Files**. Click on the file to view its details in the command-line interface and edit it accordingly: dsm.opt or tdpexc.cfg.
5. In the navigation pane, expand the **Protect and Recover** node, and click on the Exchange Server. In the **Protect** tab select the storage groups for backup.

Tip: Select multiple storage groups by holding down the **Ctrl** key while selecting.
6. Right click on the selection to view the options for backup. Choose a backup method, destination and type to start the backup.
7. Enter the Tivoli Storage Manager password provided by your Tivoli Storage Manager administrator. A **Backup Progress** panel displays that shows the progress of your backup.
8. The results and progress of the task are displayed in the Task List.
9. Exit the Console by selecting **File->Exit** in the Menu bar.

At this point, Data Protection for Exchange is installed, configured, and has performed the initial full backup of the selected storage group(s). Review the rest of this publication to become familiar with Data Protection for Exchange features,

policies, procedures, and backup strategies, including VSS operations.

Chapter 6. Protecting Microsoft Exchange Server data

Information for protecting Microsoft Exchange Server data is provided.

Setting user preferences

Use the property pages in the Data Protection Properties window to customize your Data Protection for Exchange configuration preferences.

The property pages described in this section customize preferences such as activity logging or how languages and information are displayed.

Be aware of the backup strategy, resource needs, policy settings, and hardware environment capabilities so that you configure these preferences to values that enhance Data Protection for Exchange features.

1. In the tree view of the Management Console, select the Exchange 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 instance in the window title bar.
3. Select the property page that you would like to edit. Available property pages 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** (or **Apply**) 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 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 an Exchange Server from the **Protect and Recover Data** node in the tree view of the Management Console, and clicking **Properties** in the Actions pane.

The following table shows which property pages are available for which snapshot configuration. A stand-alone environment is only supported when Tivoli Storage FlashCopy Manager is installed.

Table 19. Available property pages for Exchange Server workloads

Properties
Server Information
Server Password
Policy Management

Table 19. Available property pages for Exchange Server workloads (continued)

Properties
VSS Policy Binding
Managed Capacity
Diagnostics
General
Logging
Regional
VSS Backup
Custom Settings

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.

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 dataExchange Server data and the capacity of the volume that contains that data. For example, a set of SQL ServerExchange 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.Data Protection for Microsoft Exchange Server.

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 20. 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 applicationData Protection for Microsoft Exchange Server 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

GeneralGeneral 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.

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. This selection is the default.
- 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.

Managing policy

Data Protection for Exchange uses policy to determine how backups are retained.

Although Tivoli Storage Manager policy determines how Data Protection for Exchange backups are managed on Tivoli Storage Manager storage, 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.

For information about Tivoli Storage Manager policy, see “How Tivoli Storage Manager server policy affects Data Protection for Exchange” on page 29.

Policy binding statements

Policy binding statements associate Exchange backups to a management policy.

Specify policy binding statements to use for binding snapshots to a policy. You can complete this task by using the GUI 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 GUI to specify policy binding statements.

A policy statement is defined in the respective configuration file. For example:

	<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 Data Protection for Exchange policy.

Expiration is the process by which Exchange Server 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, Data Protection for Exchange allows you specify the number of backups to retain and the length of time to retain them. Expiration is how Data Protection for Exchange implements this function.

Expiration of backups occurs during the first query, backup, or restore operation of a Data Protection for Exchange 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 Data Protection for Exchange 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 Data Protection for Exchange 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.

Binding backups to a policy

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

1. Start the Management Console.
2. Select the **Exchange Server** 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 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 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. 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 Data Protection for Exchange managed capacity measurement is 10 GB.

To determine managed storage capacity:

1. Select an Exchange instance from the GUI.
2. In the **Protect** 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.

Using the Task Manager

The Task Manager provides a centralized panel in the Data Protection for Exchange GUI from which to view, stop, remove, or manage backup, restore, and automation tasks.

When running backup, restore, or automation tasks, use the Task Manager pane

1. Start the Management Console.
2. Click the appropriate **Protect Data** or **Recover Data** task for your data in the welcome page of the Data Protection for Exchange GUI.
3. Click **Show Activity** in the **Action** pane. The Task Manager panel opens beneath the results pane.
4. Choose a view for the current task:
 - **Task List** (default): Click this item to view 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.

- Click the appropriate icon to view statistics or a performance chart for the selected operation.
- **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).

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 data (Legacy method)

This task describes how to complete a Legacy back up of Exchange databases using the MMC GUI.

In order to perform backup tasks, Data Protection for Exchange must be operating in an account that meets these two conditions:

1. The account must be delegated with the appropriate privilege:
 - **Exchange Server 2007:** membership in the Exchange Organization Administrators group.
2. The account must be a member of the local Administrators group for the machine on which the Exchange server is running.

This procedure assumes that Data Protection for Exchange and the Tivoli Storage Manager server are properly configured in your environment. See Chapter 4, “Configuring Data Protection for Exchange,” on page 67 for detailed instructions on how to configure these applications.

Follow these steps to perform a Legacy backup of your data:

1. Start the MMC GUI. If you are running Data Protection for Exchange in a Microsoft Windows Failover Cluster or Veritas Cluster Server environment you must invoke the GUI with the */excserver* parameter from the Data Protection for Exchange command line
2. From the Tree View, select one or more storage groups to back up. You can also select one or more storage groups to back up in the List View. You cannot back up more than one application (SRS, IS) in a single operation.
3. In the Backup Options section of the Backup window, select the *Legacy Backup* method.

Note: You can specify that Data Protection for Exchange retry a failed backup by setting the *Retries for Legacy Backup* parameter in the Data Protection for Exchange Settings window. From the File Menu, click on **Edit -> Configuration -> General Tab**.

4. Specify the type of backup to perform with the *Backup Type* drop-down menu. Note that you cannot perform a database copy of an SRS database.
5. Click on the **Backup** button to begin the backup operation.

Backing up Exchange data

Follow these steps to back up Exchange Server data by using Microsoft Volume Shadow Copy Service (VSS) technology.

Before you begin, review “Exchange Server backup and restore prerequisites” on page 88.

In order to perform VSS backups, you must have a VSS provider properly configured in your environment.

To back up Exchange data:

1. Start the Management Console and select **Exchange Server** in the tree view.
2. Make sure a **Local DSMAGENT Node name** is specified. This setting is only required for VSS backups and can be specified in the Properties page.

3. In the **Protect** tab for the Exchange Server instance, select one or more storage groups or databases to back up. For Exchange Server 2007, an additional pane displays that shows the databases in each storage group. Use this pane to run a database copy backup.
4. 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](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 must run repairs on the database, which can result in data loss. If you chose to skip the integrity check and the database is not recoverable due to integrity errors, you should contact Microsoft support for help in recovering your data.
 - Set 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
 - Set the **Offload** option to use offloaded backups. An offloaded backup uses another machine (specified with the **Remote DSMAGENT Node** parameter) to move Exchange data to Tivoli Storage Manager server storage. An offloaded backup can reduce the load on network, I/O, and CPU resources during backup processing. The other machine also performs the Exchange Integrity Check. If you are going to use offloaded backups, make sure a **Remote DSMAGENT Node** is specified. This option applies only to VSS backups.
5. Click **Backup Destination** in the Action pane to specify whether you want the data to be backed up to your local server, a Tivoli Storage Manager server, or both.
6. Click **Backup Method** in the Action pane to specify whether you want to use VSS or Legacy technology to back up your data. The Legacy method is only available for Exchange Server 2007.
7. Optional: Choose a mode for the current task:
 - **Run Interactively:** Click this item to run the current task interactively. This selection is the default.
 - **Run Scheduled:** Click this item to convert the current action into a scheduled task. When you select this item, the schedule wizard will start, complete with the appropriate command that is required to complete the task.
8. Create the backup by clicking the **Action** that corresponds to the backup method that you would like to use.
 - You can perform a full backup, copy backup, copy without integrity check backup, incremental backup, 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.

Restoring an Exchange Server database

Follow these steps to restore an Exchange Server database.

To perform backup and restore tasks, Data Protection for Exchange must be operating in an account that meets the following permission requirements.

- **Exchange Server 2007:** Data Protection for Exchange 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:** Data Protection for Exchange must be operating in an account with membership in the Organization Management group.

Note: 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.

Review the “VSS restore considerations” on page 93 and “Restoring VSS Backups into alternate locations” on page 26 before attempting any type of VSS restore.

Note:

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 **Replay Restored Logs Only** option in the Restore tab or the restore operation may fail. This note applies only to Legacy restores. VSS restores to the Recovery Storage Group are supported by Microsoft only with Exchange Server 2007 or later.

Legacy backups, also referred to as traditional "streaming" backups, are not supported on Exchange Server 2010. VSS Backups can be restored using Exchange Server 2010.

CAUTION:

When you restore a storage group (Exchange Server 2007) or a database (Exchange Server 2010), data that exists in the storage group or database is overwritten, and is no longer available after the restore is complete. Instant Restore will overwrite all files on the destination file system.

1. Launch the Management Console by selecting **Start > All Programs > Data Protection for Exchange > FlashCopy Manager Management Console**.
2. Click **Recover Data** in the welcome page. 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 restore. The following features are available:
 - **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: Select the storage group or database to restore. You can click **Active Backups** to show only active backups, or click **All Backups** to show both active and inactive backups.
- Search: Use the **Search** field to filter the storage groups or databases.
- Refresh: Click **Refresh** to update the view with your changes.

If you applied a filter, the objects on the server that match the filter or search criteria are listed in the **Recover** tab. The status area indicates the number of items that match the criteria n of x displayed, where n equals the number of objects that match the filter criteria, and x is the number of objects that are retrieved from the server. For example, "5 of 20 displayed." If you specify refresh options to further narrow your results, and click **Refresh** again, the objects on the server that match the filtered and refresh options are displayed. Each time 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 backups 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" on page 95.

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.

VSS restore considerations

Be aware of these considerations when performing VSS restores.

Unless otherwise specified, "VSS restores" refers to all restore types that use VSS , including VSS Restore, VSS Fast Restore, and VSS Instant Restore.

- 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>
- Single Copy Cluster (SCC) local backups can be restored to other nodes in the cluster. Cluster Continuous Replication (CCR) local backups can only be restored to the node that performed the backup.
- You are encouraged to install any Microsoft VSS related hotfixes.

VSS Instant Restore

- When performing a VSS Instant Restore in an Exchange Server 2007 CCR or Exchange Server 2010 DAG environment, stop the Microsoft Exchange Replication Service on both the active node and the passive node before running the restore operation.
- Performing any type of **Restore Into** function will automatically disable VSS Instant Restore.
- When performing VSS Instant Restores, you must make sure that any previous background copies (that involve the volumes being restored) are completed prior to initiating the VSS Instant Restore. This situation applies to DS8000, Storwize V7000, XIV and SAN Volume Controller (non space-efficient) volumes only.
- 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 to restore the files from a VSS Backup that resides on local shadow volumes.

- (Exchange 2007) When performing a VSS Instant Restore, you must restore ALL databases within the specified storage group. You cannot perform a partial restore (*partial*) while using VSS Instant Restore. Although Data Protection for Exchange allows this operation to begin, it will either fail or complete with undesirable consequences. If you need to restore just one database from a VSS Backup that resides on local VSS shadow volumes on DS8000, SAN Volume Controller, Storwize V7000, or XIV disks, make sure to specify **InstantRestore False** in the Data Protection for Exchange GUI Restore tab. If VSS Instant Restore capability is needed for single databases, make sure to place these databases in their own storage group.

Other VSS Restore considerations:

- (Exchange 2007) Unlike Legacy restores (which only dismount the database being restored), VSS restores dismount *all* databases in the storage group that is being restored into. This is a Microsoft requirement.
- If you are performing a VSS Restore of a storage group that has been relocated (system file path, log file path, or database file path), you must use the **Restore Into** function and specify the same storage group name as the one you are restoring. The restore will fail if you do not specify the same storage group name.
- Be aware that when a VSS restore from local shadow volumes is performed, the bytes transferred will display "0". That is because no data ("0") is restored from the Tivoli Storage Manager server.

Restoring VSS Backups into alternate locations

Data Protection for Exchange allows an Exchange Server 2007 storage group, CCR replica, or LCR replica (that has been backed up using VSS) to be restored into the Recovery Storage Group or into an alternate (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 an alternate (or relocated) database.

This restore capability is referred to as a "restore into" scenario and requires the following:

- If you are operating a VSS Restore of a relocated storage group or relocated database, you must use the **Restore Into** function and specify the same storage group name or database name as the one you are restoring. The restore will fail if you do not specify the same name.
- Performing any type of restore into function will automatically disable VSS Instant Restore.

Note: Cluster Continuous Replication (CCR) local backups can only be restored to the node that performed the backup.

Preparing for VSS Instant Restore in DS6000, DS8000, Storwize V7000, XIV and SAN Volume Controller environments

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

These preparations are only applicable to the DS6000, DS8000, Storwize V7000, XIV and SAN Volume Controller disk subsystems.

Consider the following points when planning for VSS Instant Restore:

- Restore granularity is at the storage group level for Exchange Server 2007, and at the database level for Exchange Server 2010.
- VSS requires that data must always be restored to the same drive letters and paths as existed during the original backup.
- VSS requires IBM System Storage Support for Microsoft Volume Shadow Copy Service software if using a DS8000, Storwize V7000, or SAN Volume Controller disk subsystem.
- VSS requires IBM XIV Provider for Microsoft Windows Volume Shadow Copy Service if you are using an XIV disk subsystem.
- Backups must reside on the same XIV, DS6000, DS8000, Storwize V7000, or SAN Volume Controller storage subsystem to which they are restored.
- In a CCR environment, stop the Microsoft Exchange Replication Service on the active node before running the VSS Instant Restore operation.
- In a DAG environment, stop the Microsoft Exchange Replication Service on the active node before running the VSS Instant Restore operation.

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.

Complete restore or replacement

Information regarding a complete restore or replacement is provided.

For information on how to recover an Exchange Server 2007, see the Microsoft TechNet magazine article, "Data Protection and Disaster Recovery for Exchange Server 2007" at the following URL: <http://support.microsoft.com/default.aspx?scid=kb;en-us;326052>

For information on how to recover an Exchange Server 2010, see the article "Understanding Backup, Restore and Disaster Recovery" at the following URL: <http://support.microsoft.com/default.aspx?scid=kb;en-us;326052>

Individual mailbox recovery

Information about individual mailbox recovery is provided.

Backing up Exchange servers at the item-level can cause the following issues:

- Insufficient scalability as item-level backups performed hourly on each day of the week have still proven to be an inadequate solution.
- Additional resource strain is added to the production servers.
- Since database backups are still performed, the Exchange data is duplicated as item-level backups result in the same data being backed up a second time.

To address these issues, Microsoft provides these features in Exchange:

- "Deleted Item Restore" can be configured to keep items within the Exchange Server databases, even after they have been deleted. This enables the items to be restored at a later time.
- "Deleted Mailbox Restore" can be configured to keep mailboxes within the Exchange Server databases, even after they have been deleted. This enables the items to be restored or reconnected at a later time.
- The Recovery Storage Group (Exchange Server 2007) enables a database to be restored to a special storage group. Wizards and tools are provided by Exchange to extract data from this storage group. This can be performed without disrupting the production servers.
- The Recovery Database (Exchange Server 2010) enables a database to be restored to a special database. Wizards and tools are provided by Exchange to extract data from this database. This can be performed without disrupting the production servers.

With the Data Protection for Exchange mailbox restore feature, you can perform individual mailbox and item-level recovery operations in Microsoft Exchange Server 2007 or Microsoft Exchange Server 2010 environments utilizing Data Protection for Exchange backups. See “Restoring individual mailbox and mailbox item-level data” and “Restoring mailbox messages interactively with the Mailbox Restore Browser” on page 101.

Restoring individual mailbox and mailbox item-level data

Use Data Protection for Exchange to restore mailboxes and mailbox data.

This task is intended for batch operations that restore one (or more) mailboxes at a time. For item level restore operations, see “Restoring individual mailbox and mailbox item-level data.”

Requirements for Exchange Server 2007 environments: Review these requirements before attempting a mailbox restore tasks on Exchange Server 2007:

- “Security requirements for Data Protection for Exchange mailbox restore tasks on Exchange Server 2007” on page 32
- Exchange Server backup and restore prerequisites

Requirements for Exchange Server 2010 environments: Review these requirements before attempting a mailbox restore tasks on Exchange Server 2010:

- “Security requirements for Data Protection for Exchange mailbox restore tasks on Exchange Server 2010” on page 32
 - “Prerequisites for Data Protection for Exchange mailbox restore tasks on Exchange Server 2010” on page 187
 - Exchange Server backup and restore prerequisites
1. Start the Management Console and select **Exchange Server** in the tree view.
 2. In the **Recover** tab for the Exchange instance, change the selected view to **Mailbox Restore**.
 3. Select one or more mailboxes to restore. All of the mailboxes available at the time of the backup are listed, unless history has been disabled in which case you will be prompted for a mailbox alias. 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. 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, Size (in KB), Created Date, Modified Date, Sent Date, 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 concepts

Chapter 4, “Configuring Data Protection for Exchange,” on page 67

Related tasks

“Restoring mailbox messages interactively with the Mailbox Restore Browser” on page 101

“Restoring a deleted mailbox or items from a deleted mailbox”

Related reference

“Set command” on page 213

“Set positional parameters” on page 214

“Restoremailbox command” on page 186

“Restoremailbox syntax” on page 188

“Restoremailbox positional parameters” on page 190

“Restoremailbox optional parameters” on page 190

Restoring a deleted mailbox or items from a deleted mailbox

You can use the Data Protection for Exchange mailbox restore operation to restore a mailbox (or items from a mailbox) that was deleted from an Exchange Server.

Perform these steps to restore a deleted mailbox or items from a deleted mailbox prior to performing the mailbox restore operation:

1. Run a Data Protection for Exchange mailbox restore to restore the deleted mailbox.

Requirement: Data Protection for Exchange requires a temporary mailbox to perform mailbox restore operations on mailboxes that were deleted, recreated, or moved since the time of the backup you are restoring from. Use the `/TEMPMAILBOXAlias` parameter to specify the temporary mailbox. If the `/TEMPMAILBOXAlias` parameter is not set, the default is the logon user mailbox. Ensure that the temporary mailbox is active and has enough storage capacity to accommodate all items of the mailboxes that are being restored.

See “Restoremailbox optional parameters” on page 190 for details about the `TEMPMAILBOXAlias` parameter.

With the mailbox restore operation there are three options for choosing where to direct the restore of mailbox data from a deleted mailbox:

- Restore the deleted mailbox data to the original location of the original mailbox.
- Restore the deleted mailbox data into an active alternate mailbox in an online Exchange Server.
- Restore the deleted mailbox data into an Exchange Server personal folders (.pst) file.

If you are restoring the deleted mailbox data to the original location, prior to performing the mailbox restore, you must create a new mailbox.

Attention: If the backup containing the deleted mailbox was taken with a version of Data Protection for Exchange prior to version 6.1, or if the mailbox history is disabled, and the mailbox has been relocated since the time it was backed up, you must specify the Exchange Server, the storage group, and the database where the mailbox resided at the time of backup. Use the **OriginalLocation** option in the GUI to specify

this information. You can also use the **restoremailbox** command parameter, **/MAILBOXORIGLOCATION**, for this task.

See “Restoremailbox command” on page 186 for details about this command.

For Exchange 2007 the Exchange Server, Storage Group and Database where the mailbox resided need to be specified. For Exchange 2010, the Exchange Server and the Database where the mailbox resided need to be specified.

See “Restoremailbox optional parameters” on page 190 for details about the **/MAILBOXORIGLOCATION** parameter.

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, using the Mailbox Restore Browser.

Before you begin, review “Exchange Server backup and restore prerequisites” on page 88. In addition, review these interactive mailbox restore characteristics before attempting a restore operation:

- When a mailbox is selected, it is first automatically restored to the Recovery Storage Group or Recovery Database. 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.
- When the GUI is started, it detects whether there exists a Recovery Storage Group or Recovery Database that was previously created by Data Protection for Exchange. If one exists, then the GUI 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.
- 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**.
- Data Protection for Exchange restores the mailbox backup to its original mailbox location. However, you can also restore a mailbox to either of the following locations:
 - To restore a mailbox item to a different mailbox, use the **Open Exchange Mailbox** task in the Action pane. 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, Data Protection for Exchange does not create a duplicate. Data Protection for Exchange 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 action.

To interactively restore mailbox messages:

1. Start the Data Protection for Exchange GUI.
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 Mailbox to Restore dialog opens.
4. Specify the mailbox to restore:
 - 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 field or scroll down through the list and select a mailbox. The list is populated using mailbox history taken at the time the backup occurred. If mailbox history is disabled, you can use the **Search** field to filter the mailboxes. You can also sort the mailboxes by columns. Click **OK**.

Note: You can also specify a date and time 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. Use the **Search** field to filter the databases. You can also sort the databases by columns. 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 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, you must configure it before running the restore action. Right-click the dashboard and select **Properties**, then click **E-mail** 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, Data Protection for Exchange 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 Data Protection for Exchange GUI.

Restore using the Recovery Storage Group or Recovery Database

Information about how to restore mailbox databases using the Recovery Storage Group (Exchange Server 2007) and the Recovery Database (Exchange Server 2010) feature is provided.

Legacy restores can be performed in Exchange Server 2007 environments. Use VSS Restore for Recovery Storage Group (Exchange Server 2007) or Recovery Database (Exchange Server 2010).

Requirements for using the Recovery Storage Group or Recovery Database

These requirements must be met for this procedure to be successful.

- For Legacy restores, the mailbox database to be restored can reside on any server running Exchange Server 2007 within the same Admin group.
- For VSS Restores, the mailbox database to be restored can reside on any server running Exchange Server 2007 or Exchange Server 2010 within the same Admin group. The backup must have been taken on the same version of Exchange Server for the restore to complete.

- If you are restoring multiple Exchange Server 2007 mailbox stores at the same time, they all must be from a single storage group.
- You must run the restore from an account that has Receive As and Send As permissions on all mailboxes to be restored.
- You cannot use multiple instances of Data Protection for Exchange to restore databases into the Recovery Storage Group (Exchange Server 2007) or Recovery Database (Exchange Server 2010) simultaneously.

Restoring data to a Recovery Storage Group or Recovery Database

You need to have already backed up your storage group (Exchange Server 2007) or database (Exchange Server 2010) before attempting this task.

Information regarding Recovery Storage Group or Recovery Database processing is written to the Data Protection for Exchange activity log file (tdpexc.log by default).

Note: When restoring to a Recovery Storage Group or Recovery Database, you must specify the option to replay restored logs only, otherwise the restore can fail. Select **Replay Restored Logs ONLY** in the GUI Restore tab or specify `/recover=applyrestoredlogs` on the command line.

To restore data to a Recovery Storage Group or Recovery Database:

1. Use the Exchange Management Console to create the Recovery Storage Group (Exchange Server 2007) or Recovery Database (Exchange Server 2010) if one does not already exist. You can also use PowerShell commands (cmdlets) to perform this step.
2. Use the Exchange Management Console (Exchange Server 2007) to add the mailbox database you want to restore to the Recovery Storage Group. You can also use PowerShell commands (cmdlets) to perform this step.
3. Use Data Protection for Exchange to restore the mailbox database. Make sure that no public folders within the storage group or database are selected.

- **Legacy restore Recovery Storage Group processing:**

For legacy restores, by default, the database is restored directly to the Recovery Storage Group. The Data Protection for Exchange GUI will display a text message to remind you that all mailbox database restores will go to the Recovery Storage Group if a Recovery Storage Group exists. If a Recovery Storage Group exists on the server, ensure that it contains the information for the backed-up storage group and database before you perform a legacy restore. For legacy restores, if a Recovery Storage Group does *not* exist, the database is restored directly to the original storage group.

- **VSS Restore Recovery Storage Group processing (Exchange Server 2007):**

For VSS Restores, select the name of an Exchange Server 2007 Storage Group into which a VSS Backup will be restored (use the INTO command to select the Storage Group to restore into). To restore into a Recovery Storage Group, a Recovery Storage Group must already exist with the databases to be restored already added.

- **VSS Restore Recovery Database processing (Exchange Server 2010):**

For VSS Restores, select the name of an Exchange Server 2010 database into which a VSS Backup will be restored (use the INTO command to select the database to restore into). To restore into a Recovery Database, a Recovery Database must already exist.

Attention: Only transaction logs that are contained in the backup will be applied to the mailbox database when running a Recovery Storage Group or Recovery Database restore.

Restoring a Database Availability Group database copy

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

You can perform some of these steps using either the Exchange Management Console or the Exchange Management Shell commands, which are provided below in parentheses.

To restore a Database Availability Group database copy:

1. Make the database that you want to restore active (Move-ActiveMailboxDatabase).
2. Suspend replication of the all passive copies of the database (Suspend-MailboxCopy).
3. Unmount the active mailbox database (Dismount-Database).
4. Stop the replication service on all copies of the database. Do this step only for a VSS Instant Restore operation.
5. Restore the database and logs using the Data Protection for Exchange command line or GUI.

Restriction: The database must not be mounted automatically after the restore. If using the GUI, 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. (Get-MailboxDatabaseCopyStatus)
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)

Restoring backups to an alternate server

An alternate server restore is a restore of backups that were backed up on one server (Server1) and restored using a different server (Server2). A typical reason for performing an Alternate Server Restore is that a restore operation consumes too many resources to be run on the production server.

A common scenario consists of restoring backups from one server into a Recovery Database (Exchange Server 2010) or a Recovery Storage Group (2007) on another server. The example in this procedure uses two servers: Server1 and Server2. Server1 is the production server running scheduled backups of the production Exchange databases or storage groups. Server2 is not a production server; it is used by the Exchange administrator for administrative tasks and is used to run a VSS restore operation.

VSS operations require two nodes to work in tandem to backup or restore data. One node represents Data Protection for Exchange, and the other node represents the LOCALDSMAGENTNODE. This is also the VSS requestor. Legacy restores do not use a VSS requestor.

In this example, the Data Protection for Exchange NODENAME for Server1 is known by the Tivoli Storage Manager server as SERVER1_EXC, and the LOCALDSMAGENTNODE for Server1 is known by the Tivoli Storage Manager server as SERVER1. For Server2, the NODENAMES are SERVER2_EXC and SERVER2 respectively.

1. In order for Server2 to access the backups for Server1, two things must occur.
 - a. (VSS restores only) Server2 must have permission to access the backups done by Server1 on the Tivoli Storage Manager server. This is done using the Tivoli Storage Manager server GRANT PROXY command:
`GRANT PROXY TARGET=SERVER1_EXC AGENT=SERVER2`
 - b. The Data Protection for Exchange client on Server2 must be configured so that it can query and restore backups done by Server1. To do this the NODename option of the Data Protection for Exchange client on Server2 is changed to the NODename option of the Data Protection for Exchange client on Server1 in the dsm.opt file in the Data Protection for Exchange directory. (By default, this is c:\Program Files\Tivoli\TSM\TDPEXchange). We recommend making a copy of your original dsm.opt file and renaming the copy to dsm_Server1, then modifying the NODename value in the dsm_Server1.opt file to SERVER1_EXC. Original NODename: SERVER2_EXC Updated NODename: SERVER1_EXC All subsequent commands require the /TSMOPTFILE=dsm_Server1.opt option to access the Tivoli Storage Manager server with the Server1 node name.
2. The first time that you query the Tivoli Storage Manager server after updating the dsm_Server1.opt file, you will need to supply the password for Server1. If you are using the CLI, we recommend that you use the /tsmpassword option on the first query to save the password.
 - a. Query and save the password. `tdpexcc query tsm /tsmpassword=secret /tsmoptfile=dsm_server1.opt`
 - b. Now you can query the Tivoli Storage Manager server without the specifying the password. `tdpexcc query tsm /tsmoptfile=dsm_server1.opt`

If you are using the GUI, you are prompted for the password if it is not saved. By default, the GUI uses the dsm.opt file in the installation directory. In order to use the OPT file that you created, in this example dsm_server1.opt, launch the GUI from the command line and pass in the /TSMOPTFILE option. (You cannot launch the GUI from the MMC using this option.)

- a. Launch the GUI from command line with /TSMOPTFILE option `tdpexc /tsmoptfile=dsm_server1.opt`
3. Restore the Exchange database into the Recovery Database (Exchange Server 2010) or the storage group into a Recovery Storage Group (Exchange Server 2007). If you are doing an Individual Mailbox Recovery only, then skip this step.

Note: Before you can perform a legacy (streaming) restore of a database to a Recovery Storage Group that is on an alternate server, you must add the backed-up database to a Recovery Storage Group on the alternate server. For example, if you have a legacy backup of a database (DB1) from a storage group (SG1) on a server (Server1), and you want to restore the backup of that database to a Recovery Storage Group on an alternate server (Server2), you

must create a Recovery Storage Group on Server2 and add Server1\SG1\DB1 to the Recovery Storage Group on Server2.

- CLI

- a) You can query for all available backups with the following command. The /FROMEXCSErVer and /TSMOPTFILE options are required.
tdpexcc query TSM * /FROMEXCSErVer=server1 /tsmoptfile=dsm_server1.opt /ALL

- b) Issue the **restore** command. The /FROMEXCSErVer option is required. Follow the procedure in “Restoring data to a Recovery Storage Group or Recovery Database” on page 104. Include the /fromexcserver=Server1 and /TSMOPTFILE=dsm_server1.opt options in all your commands.

- GUI

- a) By default, the GUI uses the dsm.opt file in the installation directory. In order to use the OPT file that you created, in this case dsm_server1.opt, launch the GUI from the command line, and pass in the /TSMOPTFILE option. You cannot launch the GUI from the MMC. Launch the GUI from command line with the /TSMOPTFILE option. For example:tdpexc /tsmoptfile=dsm_server1.opt

- b) Follow the procedure in “Restoring data to a Recovery Storage Group or Recovery Database” on page 104.

- 4. Follow these steps if you are doing an Individual Mailbox Recovery from an alternate server.

- CLI

- a) Issue the Individual Mailbox Recovery command. Follow the procedure in “Individual mailbox recovery” on page 97. Include the /TSMOPTFILE=dsm_server1.opt option in all your commands.

- GUI

- a) By default, the GUI uses the dsm.opt file in the installation directory. In order to use the OPT file that you created; in this case dsm_server1.opt, you must launch the GUI from the command line and pass in the /TSMOPTFILE option. You cannot launch the GUI from the MMC. Launch the GUI from command line with the /TSMOPTFILE option. For example:tdpexc /tsmoptfile=dsm_server1.opt

- b) Follow the procedure in the “Individual mailbox recovery” on page 97 section of this document.

Deleting Exchange Server Backups

Use this procedure to remove 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 welcome page of the Management Console.
3. In the **Recover** tab for the Exchange instance, select **View: Database Restore**. Use the results pane to browse and select one or more database backups to delete.

4. Click **Delete Backup** in the **Action** pane to delete the backups of the selected databases.

Note: 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 23.

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 results pane at the top. 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 tdpexcc. For example, for each selected workload instance, you can enter a single command or multiple commands, such as:

```
q tsm
q exc
```

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 Exchange Server 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 storage groups or databases 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.

Using the Tivoli Storage Manager scheduler

Information about how to use the Tivoli Storage Manager scheduler with Data Protection for Exchange to automate a full backup of Exchange Server storage groups is provided.

When Data Protection for Exchange has been registered to a Tivoli Storage Manager server and installed on the Exchange Server, the procedure involves the following steps:

1. **On the Tivoli Storage Manager server:**
 - a. Define a schedule to run a Windows command file in the policy domain to which Data Protection for Exchange is registered.
 - b. Associate the Data Protection for Exchange node to the defined schedule.
2. **On the machine where Data Protection for Exchange and the Exchange Server are installed:**
 - a. Install the Tivoli Storage Manager scheduler client as a Windows service for Data Protection for Exchange. If a scheduler exists for the regular Tivoli Storage Manager backup-client, install another one for Data Protection for Exchange.

Note: If the schedule backs up Exchange Server 2007 CCR copies, the schedule must be running on another node.

- b. Define a command file that contains Data Protection for Exchange commands to perform the backup.
- c. If you are running in a Single Copy Cluster (SCC) server environment, install the Tivoli Storage Manager scheduler as a Windows service *on both cluster nodes*.
- d. If you are running in an SCC cluster server environment, create a cluster resource that represents the Tivoli Storage Manager scheduler. Verify that the cluster resource is started. This service is dependent on the Exchange Server cluster resource.
- e. Start the Tivoli Storage Manager scheduler installed in the first step.

Example scheduler procedure

Refer to this example when scheduling backup operations.

This example assumes the following environment:

- Data Protection for Exchange is registered to a Tivoli Storage Manager server:
 - The node name is *mynode*.
 - The password is *mypassword*.
 - The policy domain is *mydomain*.
- The event to be scheduled:
 - A daily full Legacy backup of all storage groups.
 - The backups begin between 9:00 and 9:15 pm.
- Exchange Server is installed on a Windows 2003 system.

Complete these tasks on the Tivoli Storage Manager server

You must set up a scheduler service on the machine where the backup-archive client is installed before performing this procedure.

1. Create a command file called `c:\excfull.cmd`. A sample command file (`excfull.smp`) is provided in the directory where Data Protection for Exchange is installed. This sample file contains commands necessary to perform a scheduled full Legacy backup of all Exchange Server storage groups to Tivoli Storage Manager storage. You must specify **COMPLETE PATHNAMES** in the command file for all file names and non-system commands.

Note: Perform the following if you are setting up the scheduler for an Exchange Server running in Single Copy Cluster (SCC) environment:

- Your command file must reside on the Exchange Server File Share. The schedule you define on the Tivoli Storage Manager server needs to match this command file. In Step 1 and Step 2, the command file `c:\excfull.cmd` could be `x:\excfull.cmd` where *x* is the Exchange Server File Share.
- The *tsmoptfile* and *logfile* options specified in your command file must reflect the location of the options file and log file on the Exchange Server File Share.

2. Enter the following command to define the schedule. You can enter this command on the server console or from an administrative client. The administrative client does not have to be running on the same system as the Tivoli Storage Manager server.

```
def sched mydomain my_schedule desc="Exchange Daily Full Legacy Backup" action=command objects="c:\excfull.cmd" priority=2 starttime=21:00 duration=15 duru=minutes period=1 perunits=day dayofweek=any
```

Note that if there is a space in the directory specified for the *object* parameter, then the directory must be enclosed in two sets of quotation marks. For example:

```
objects="\"c:\Program Files\Tivoli\TSM\TDPEXchange\excfull.cmd\""
```

Tivoli Storage Manager displays this message:

```
ANR2500I Schedule MY_SCHEDULE defined in policy domain MYDOMAIN.
```

3. Issue the following command to associate Data Protection for Exchange to this schedule:

```
define association mydomain my_schedule mynode
```

Tivoli Storage Manager displays this message:

```
ANR2510I Node MYNODE associated with schedule MY_SCHEDULE in policy domain MYDOMAIN.
```

A schedule is now defined on the Tivoli Storage Manager server with the following attributes:

- It runs a command file called `c:\excfull.cmd`.
- It begins at 9:00 pm.
- It is performed daily and can start on any day of the week.

You can use the Tivoli Storage Manager administrative commands **query schedule** and **query association** to confirm that the schedule and association are set correctly.

Complete these tasks on the Exchange Server

These tasks are performed on the Exchange Server.

This section of the procedure assumes the following environment:

- The Tivoli Storage Manager Backup-Archive client is installed on the Exchange Server in the d:\Program Files\Tivoli\TSM\baclient directory.
- Data Protection for Exchange is installed on the Exchange Server in the d:\Program Files\Tivoli\TSM\TDPEExchange directory.
- The communication options in the dsm.opt option files located in these directories point to the Tivoli Storage Manager server to which the Exchange storage groups are to be backed up.

The options file that is defined for Data Protection for Exchange is used by the scheduler when validating the node and password. The options file is also used when contacting the Tivoli Storage Manager server for schedule information.

If this message displays:

A communications error occurred connecting to
the Tivoli Storage Manager Server

Then:

1. Make sure the communication options in the dsm.opt file points to the correct Tivoli Storage Manager server.
2. Make sure the Tivoli Storage Manager server is running.

All cluster references in this procedure refer to a Single Copy Cluster (SCC) setup.

Perform the following steps on the Exchange Server:

1. Login using a Windows account that has administrative privileges.
2. Open a Windows command prompt window.
3. In the window, issue the following command:

```
cd /d d:"Program Files"\Tivoli\TSM\baclient
```

You must place quotation marks around the section of a directory pathname that contains a space (for example: d:"Program Files"\Tivoli\TSM\baclient. You can also use the short form of a pathname by placing a tilde (~) and unique identifier after the first six characters in the pathname. An example of the short form of the pathname is shown below:

```
d:\Progra~1\Tivoli\TSM\baclient
```

Note: If a Tivoli Storage Manager scheduler is already installed on your machine (for the regular backups of the Windows system), you need to install another scheduler (with a unique name) to run the schedules defined for Data Protection for Exchange. The Tivoli Storage Manager scheduler must have a different node name from the regular Tivoli Storage Manager backup-archive client.

4. In the window, issue the following command:

```
dsmcutil INSTall scheduler /name:"Data Protection for Exchange Scheduler"  
/node:mynode /password:mypassword /autostart:yes  
/clientdir:"d:\Program Files\Tivoli\TSM\baclient"  
/optfile:"d:\Program Files\Tivoli\TSM\TDPEExchange\dsm.opt"  
/startnow:no
```


The Windows ID that is used to start the scheduler service may require that you specify the client **dsmcutil** options *ntdomain*, *ntaccount*, and *ntpassword* in this command.

Note: If you are setting up the scheduler for an Exchange Server running in a cluster environment (SCC only):

- a. Change the */autostart* option to *no* and add the */clusternode* and */clustername* options. For example:
`/autostart:no /clusternode:yes /clustername:your cluster name`
- b. Move the Exchange virtual server to the secondary node of the cluster to create the scheduler service. Make sure the secondary node of the cluster has ownership of the Exchange virtual server.
- c. The primary node of the cluster must contain the command file on the file share used to create the scheduler service.
- d. Copy the options file (dsm.opt in the Step 4 example) to a shared drive associated with the virtual server. For example:
`/optfile:"x:\dsm.opt"`

Tivoli Storage Manager displays this output:

```
TSM Windows Client Service Configuration Utility
Command Line Interface - Version 6, Release 3, Level 0.0
(C) Copyright IBM Corporation, 1990, 2011, All Rights Reserved.
TSM Api Version 6.3.0
```

```
Command: Install TSM Client Service
Machine: TDPEX1(Local Machine)
```

```
Installing TSM Client Service:
```

```
Machine : MYNODE
```

```
Service Name : Data Protection for Exchange Scheduler
```

```
Client Directory : D:\Program Files\Tivoli\TSM\baclient
```

```
Automatic Start : yes
```

```
Logon Account : LocalSystem
```

```
The service was successfully installed.
```

```
Creating Registry Keys ...
```

```
Updated registry value 'ImagePath' .
Updated registry value 'EventMessageFile' .
Updated registry value 'TypesSupported' .
Updated registry value 'Data Protection for Exchange Scheduler' .
Updated registry value 'ADSMClientKey' .
Updated registry value 'OptionsFile' .
Updated registry value 'EventLogging' .
Updated registry value 'ClientNodeName'.
```

```
Generating registry password ...
```

```
Authenticating password with Tivoli Storage Manager for node MYNODE ....
```

```
Connecting to Tivoli Storage Manager via client options file
'd:\Program Files\Tivoli\TSM\TDPEXchange\dsm.opt' ...
```

```
Password authentication successful.
```

```
The Registry password for node MYNODE has been updated .
```


Note: If you need to make corrections after installing a service:

- a. Issue the following command to remove the service:

```
dsmcutil remove /name:"Data Protection for Exchange Scheduler"
```

- b. Issue the command in Step 4 again to install a new service.

If you are setting up the scheduler service for an Exchange Server running in a cluster environment, repeat Step 1 through Step 4 on the secondary node of the cluster.

Important: The name of the scheduler service created by the **dsmcutil** command in Step 4 and the cluster service must have the same logon authority.

5. The Tivoli Storage Manager scheduler is now installed but has not started. To start the scheduler IN A NON-CLUSTER ENVIRONMENT, issue the following command in the Windows command prompt window:

```
net start "Data Protection for Exchange Scheduler"
```

This output is displayed:

```
The Data Protection for Exchange Scheduler service is starting.  
The Data Protection for Exchange Scheduler service was started  
successfully.
```

Because */autostart:yes* is specified, the Tivoli Storage Manager scheduler automatically starts each time the Windows system is rebooted.

Note: The following steps are for the Microsoft Cluster Administrator interface in a Windows Server 2003 environment. If you are operating in a Windows Server 2008 environment, the step details are different. Consult the Microsoft Failover Cluster Management console documentation for the steps to follow using the new Microsoft Failover Cluster Management console that is included with Windows Server 2008.

- If you are creating the scheduler service in a *non-cluster* environment, proceed directly to Step 13.
- If you are creating the scheduler service in a *cluster* environment, perform Step 6 through Step 13.

The newly created scheduler service is tied to a cluster group. This allows the Tivoli Storage Manager scheduler to correctly fail over between the nodes and also manage automatic password changes.

6. Start the Cluster Administrator.
7. Select the Exchange Server Cluster Group and create a new Resource to represent the Data Protection for Exchange scheduler (**File > New > Resource**). Make sure the following parameters are specified:

Resource Type

Specify *Generic Service*.

Group Specify the Exchange Virtual Server.

Possible Owners

Make sure both node machines are listed. Add them if they are not listed.

Resource Dependencies

Make sure the Exchange Virtual server and the shared drives where the options file is located are listed.

Generic Service→Service Name

Specify the exact name of the scheduler service.

For example:

Name: Data Protection for Exchange Scheduler
Description: Data Protection for Exchange Scheduler
Resource Type: Generic Service
Group: MARSEXC1

Dependencies: Microsoft Exchange Information Store Instance

Service Name: Data Protection for Exchange Scheduler
(this MUST match the name of the service
that you installed earlier)

Registry Replication: None

8. Select the new resource and modify its properties. Under the **Registry Replication→Root Registry Key** parameter, add the exact key where the Data Protection for Exchange node name is listed. For example:

SOFTWARE\IBM\ADSM\CurrentVersion\Nodes\<nodename>\<tsm-server-name>\

Replace <nodename> with your Data Protection for Exchange node name. For example:

SOFTWARE\IBM\ADSM\CurrentVersion\NODES\MYNODE\TSMServerName

9. In the Windows command prompt window, change to the Data Protection for Exchange installation directory.
cd /d d:\Program Files\Tivoli\TSM\TDPEXchange
10. Verify that the *clusternode* option in the dsm.opt file is set to *yes*. After this is verified, enter a command that connects with the Tivoli Storage Manager server. Specify the *tsmpassword=yourpassword* parameter to ensure the correct password is stored in the registry. This allows the scheduler to properly connect automatically to the Tivoli Storage Manager server.
tdpexcc query tsm /tsmpassword=mypassword
11. From the Cluster Administrator, select the new resource and bring it online (**File→ Bring Online**).
12. After the new resource is online, move the Group from the secondary node to the primary node of the cluster. Verify that the Data Protection for Exchange scheduler service on the primary node has started.
13. Your system is now ready to run the scheduled full Legacy backups of the Exchange storage groups.

Scheduler considerations

Review these characteristics when defining a Tivoli Storage Manager schedule.

- If the schedule will back up Exchange Server 2007 CCR copies, the schedule must be running on the alternate node. Also, you must set up the scheduler service to be dependant on the cluster resource representing the CCR database. This dependence ensures that regardless of the node that the replica is running on, the replica copy is backed up.
- If you are using both Legacy and VSS Backups, make sure your backup schedules do not overlap as the second backup may fail. This failure is due to Exchange not allowing Legacy and VSS Backups to process at the same time.
- If you want to use the Tivoli Storage Manager server-prompted scheduling mode, you must ensure that the Data Protection for Exchange option file has the *tcpclientaddress* and *tcpclientport* options specified. If you want to run more

than one scheduler service, use the same *tcpclientaddress*. However, you must use different values for *tcpclientport* (in addition to the different node names). An example of running more than one scheduler service is when you are scheduling Data Protection for Exchange as well as the regular Windows backup client.

Server-prompted scheduling is supported only when TCP/IP communication is being used. By default, Data Protection for Exchange uses the client polling schedule mode.

- If any changes that affect the scheduler are made to the Data Protection for Exchange options file, the scheduler has to be restarted in order to pick up the changes. An example of this is the Tivoli Storage Manager server address, the schedule mode, or the client TCP address or port. This can be done by issuing the following commands:

```
net stop "Data Protection for Exchange Scheduler"  
net start "Data Protection for Exchange Scheduler"
```

Important: If you are running the scheduler service in a cluster environment, use the Cluster Administrator to stop and restart your scheduler service. Do *not* use the *net stop* and *net start* commands.

- The default Tivoli Storage Manager scheduler log file (dsmsched.log) contains status information for the Tivoli Storage Manager scheduler. In this example, the file is located in this path:

```
d:\Program Files\Tivoli\TSM\TDPEXchange\dsmsched.log
```

You can override this file name by specifying the *schedlogname* option in the Data Protection for Exchange options file.

- Data Protection for Exchange creates its own log file with statistics about the backed up storage group objects when the */logfile* parameter is specified during the **tdpexcc** command. In the sample file (excfull.smp), the log file is excsched.log. This file is different from the Tivoli Storage Manager scheduler log file and must also be different from the file to which the **tdpexcc** command output is redirected. In the example above, this file is excfull.log.

Note: Output from scheduled commands are sent to the scheduler log file (dsmsched.log). After scheduled work is performed, check the log to ensure the work completed successfully.

When a scheduled command is processed, the scheduler log might contain the following entry:

```
Scheduled event eventname completed successfully
```

This is merely an indication that Tivoli Storage Manager successfully issued the scheduled command associated with the *eventname*. No attempt is made to determine the success or failure of the command. You should assess the success or failure of the command by evaluating the return code from the scheduled command in the scheduler log. The scheduler log entry for the command's return code is prefaced with the following text:

```
Finished command. Return code is:
```

If any scheduled backups fail, the scheduler script will exit with the same error code as the failed backup command. A non-zero error code means that backup failed.

- If *passwordaccess generate* is not specified in the dsm.opt file, then the Tivoli Storage Manager password needs to be specified on the **tdpexcc** command. To specify the password, use the */tsmpassword* parameter in the command file

being run by the scheduler (excfull.cmd). You can also specify the password on the Data Protection for Exchange command line. For example:

```
tdpexcc query tsm /tsmnode=mars1 /tsmpassword=newpassword
```

If you plan to perform scheduled VSS operations in a cluster environment, be aware of these considerations:

- Install the Tivoli Storage Manager scheduler as a Windows service on both cluster nodes.
- If the command file resides on a local drive, you must make sure that it remains consistent on all cluster nodes. Optionally, you can create the command file on a shared drive. Make sure the *objects* parameter (specified with the **define schedule** command on the Tivoli Storage Manager server) points to this command file.

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.

Chapter 7. Troubleshooting Data Protection for Exchange with VSS backup-restore support

Data Protection for Exchange provides support for protecting Microsoft Exchange databases through two different methods.

One method, referred to as "legacy" is through the Microsoft Exchange streaming API. The other method is the Microsoft Virtual Shadow Copy Service (VSS).

If you encounter a problem during Data Protection for Exchange processing using VSS for backup and restore, perform the following steps as your first attempt to resolve the problem:

1. Retry the operation that failed.
2. If the problem still exists, close other applications, especially those applications that interact with Exchange (antivirus applications, for example). Retry the operation that failed.
3. If the problem still exists:
 - a. Shut down the Exchange server.
 - b. Restart the Exchange server.
 - c. Run the operation that failed.
4. If the problem still exists:
 - a. Shut down the entire computer.
 - b. Restart the computer.
 - c. Run the operation that failed.
5. If the problem still exists, determine if it is occurring on other Exchange servers.

Installation Problems: Creating an installation-log file

In the event of an installation failure, gather the installation information details to assist IBM Software Support when evaluating your situation. You can create a detailed log file of the failed installation that can facilitate analysis of your situation.

Note: The installation wizard collects log files for the installation process. To view the log files, on the navigation pane go to **Manage > Diagnostics > Trace And Log Files**. The log files are listed in the top pane of the window, scroll and click to the log file you are looking for to display it in the bottom pane of the window.

In the case of an issue, the following installation information details should be gathered for IBM Software Support:

- Operating system level
- Service pack
- Hardware description
- Installation package (from the DVD or downloaded) and level
- Any Windows event log that is relevant to the failed installation
- Windows services that were active during the failed installation (for example, antivirus software)

- Whether you are logged on to the local system console (not through a terminal server)
- Whether you are logged on as a local administrator, not a domain administrator (Tivoli does not support cross-domain installs)

You can create a detailed log file (setup.log) of the failed installation. Run the setup program (setup.exe) in the following manner:

```
setup /v"/l*v setup.log"
```

Determining if the problem resides on Tivoli Storage Manager or Exchange

You can help determine whether a problem is a Data Protection for Exchange issue or an Exchange server issue.

Legacy operations and VSS operations have different sets of steps to follow to help determine the source of the problem.

For Legacy operations, perform the following steps to help identify the source of the problem:

- Try recreating the problem with the Microsoft BACKREST application. This application can run backups using the Microsoft Exchange APIs. If the problem is recreatable with BACKREST, then the problem most likely exists within the Exchange server. Microsoft includes BACKREST with the Exchange Software Developer's Kit (SDK). IBM Service can provide a copy of BACKREST if you encounter problems obtaining or building this application.
- Check whether the error message "ACN5350E An unknown Exchange API error has occurred" is displayed. If this message is displayed, the Exchange server encountered an unexpected situation. Microsoft assistance may be needed if the problem continues.
- Data Protection for Exchange error messages occasionally contain an HRESULT code. Use this code to search Microsoft documentation and the Microsoft Knowledge Base for resolution information. The Exchange SDK file ESEBKMSG.H contains these messages.

For VSS operations, perform the following steps to help identify the source of the problem: Try recreating the problem with the Microsoft VSHADOW or DISKSHADOW applications. These applications can run backups using the Microsoft Exchange VSS APIs. If the problem is recreatable with VSHADOW or DISKSHADOW, the problem probably exists within the VSS provider or the Exchange server.

Microsoft includes VSHADOW with the Volume Shadow Copy Services (VSS) Software Developer's Kit (SDK). IBM Service can provide a copy of VSHADOW if you encounter problems obtaining or building this application.

DISKSHADOW is included with Windows Server 2008 and later.

Determining if the problem is a Data Protection for Exchange issue or a general VSS issue

The Data Protection client interacts closely with the backup-archive client (DSMAGENT), which performs all of the Virtual Shadow Copy Service (VSS) operations. Determine first if the problem is with the Microsoft VSS service or with the Tivoli Storage Manager.

Perform the following steps to try to isolate the source of the error:

1. Test the connectivity between the Data Protection client and the Tivoli Storage Manager dsmagent. Select the Exchange workload that you want to work with and click the Automate tab to open the Automate view. Issue the **Query Exchange** command in the bottom details pane and click **Execute** (or **Enter**). The results are displayed in the pane. As an alternative, issue the **TDPEXCC QUERY EXCHANGE** command on the computer where the Exchange server is installed to verify that your installation and configuration is correct. The **TDPEXCC QUERY EXCHANGE** command returns information about the following items:
 - Exchange Server status
 - Storage groups
 - Circular logging
 - VSS components

The following example shows a sample of the output that is generated by the **TDPEXCC QUERY EXCHANGE** command:

```
Volume Shadow Copy Service (VSS) Information
-----
Writer Name           : Microsoft Exchange Writer
Local DSMAGENT Node   : SERVERA
Writer Status         : Online
Selectable Components : 4
```

If the **TDPEXCC QUERY EXCHANGE** command does not return all of this information, you might have a proxy configuration problem. Contact the Tivoli Storage Manager server administrator to have the correct server **GRANT PROXY** commands issued to enable proxy authority for nodes. If all of the information returned to you seems correct, proceed to the next step.

2. To determine if the problem is with the Microsoft VSS service, use the **vssadmin**, **diskshadow**, and **vshadow** tools to recreate the VSS issue. On failure, use these programs to recreate the error to determine whether it is a general VSS problem or a problem within the Tivoli Storage Manager code.

vssadmin

A utility that is installed with your operating system. It can show current volume shadow copy backups and all installed shadow copy writers and providers in the command window. The following commands are examples of possible **VSSADMIN** commands:

```
VSSADMIN LIST WRITERS
VSSADMIN LIST PROVIDERS
VSSADMIN LIST SHADOWS
```

Restriction: The **VSSADMIN LIST SHADOWS** command does not list shadows of SAN-attached volumes for Windows 2008 and later.

The **vssadmin** utility uses Microsoft Software Shadow Copy provider to list the shadows that are created.

For more information on the **vssadmin** utility, see the Microsoft technical paper

diskshadow

The **diskshadow** tool is available on Windows 2008 server and 2008 R2. See the <http://technet.microsoft.com/en-us/library/cc772172%28WS.10%29.aspx> site for more information. Before installing Tivoli Storage Manager for Mail, test the core VSS functionality. The following **diskshadow** testing can be performed before any Tivoli Storage Manager components are installed:

- a. Test non-persistent shadow copy creation and deletion by running the following **DISKSHADOW** commands:

```
diskshadow>add volume f: (database volume)
diskshadow>add volume g: (log volume)
diskshadow>create
diskshadow>list shadows all
diskshadow>delete shadows all
```

Note: Volumes f: and g: represent the Exchange database and log volumes. Repeat the **DISKSHADOW** commands four times and verify that the Windows event log file contains no errors.

- b. Test persistent shadow copy creation and deletion by running the following **DISKSHADOW** commands:

```
diskshadow>set context persistent
diskshadow>add volume f: (database volume)
diskshadow>add volume g: (log volume)
diskshadow>create
diskshadow>list shadows all (this might take a few minutes)
diskshadow>delete shadows all
```

Note: Volumes f: and g: represent the Exchange database and log volumes. Repeat the **diskshadow** commands four times and verify that the Windows event log file contains no errors.

- c. Test non-persistent transportable shadow copy creation and deletion by running the following **DISKSHADOW** commands:

```
diskshadow>set context persistent
diskshadow>set option transportable
diskshadow>add volume f: (database volume)
diskshadow>add volume g: (log volume)
diskshadow>set metadata c:\metadata\exchangemeta.cab
(the path where you want the metadata stored)
diskshadow>create
```

You must copy the **exchangemeta.cab** file from the source server to the offload server. After copying the file, issue the following commands:

```
diskshadow>load metadata newpath/exchangemeta.cab
diskshadow>import
diskshadow>list shadows all (this might take a few minutes)
diskshadow>delete shadows all
```

Note: Volumes f: and g: represent the Exchange database and log volumes. Repeat the **diskshadow** commands four times and verify that the Windows event log file contains no errors.

When all of the test commands complete successfully, you can install the Tivoli Storage Manager components.

vshadow

A utility included with the Microsoft Volume Shadow Copy Services SDK that can be used to exercise most of the VSS infrastructure, such as creating/querying/deleting shadow copies. You can also use vshadow to create both persistent and nonpersistent shadow copies, transportable snapshots, and assign a drive letter or mount point to a shadow copy. See the <http://msdn.microsoft.com/en-us/library/> site.

- The following items can be determined by using the vssadmin or vshadow utility:
 - Verify VSS provider configurations
 - Rule out any possible VSS problems before running the Tivoli Storage Manager VSS functions
 - That you might have a VSS configuration problem or a real hardware problem if an operation does not work with **vshadow**, **diskshadow** or **vssadmin**
 - That you might have a Tivoli Storage Manager problem if an operation works with vshadow/vssadmin but not with the Tivoli Storage Manager
- Perform the following tests to ensure that VSS is working correctly:

Test nonpersistent shadow copy creation and deletion

- a. Run “VSHADOW *k*: *l*:” where *k*: and *l*: are the Exchange Server database and log volumes.
- b. Repeat the previous step four times.
- c. Inspect the Windows Event Log to ensure that things look appropriate.

Test persistent shadow copy creation and deletion

- a. Run “VSHADOW -p *k*: *l*:” (where *k*: and *l*: are the Exchange Server database and log volumes. You might need to run “VSHADOW -da” if you do not have enough space.
- b. Repeat the previous step 4 times.
- c. Inspect the Windows Event Log to ensure that things look appropriate.

Test nonpersistent transportable shadow copy creation and deletion (VSS Hardware Provider environments only)

- a. Run “VSHADOW -p -t=export.xml *k*: *l*:” where *k*: and *l*: are the Exchange Server database and log volumes.
- b. Copy the resultant “export.xml” file from computer 1 to computer 2 before performing the next step.
- c. On the computer you have set aside for offload, run “VSHADOW -i=export.xml”
- d. Inspect the Windows Event Log to ensure that things look appropriate.

If any of these tests fail repeatedly, there is hardware configuration problem or a real VSS Problem. Consult your hardware documentation for known problems or search Microsoft Knowledge Database for any information.

If all tests pass, continue to Step 3.

3. Recreate your specific problem by using **vshadow** or **diskshadow**. If you can recreate your problem only through a series of steps (for example: a backup fails only when you perform two consecutive local backups), try to perform those same tests by using **vshadow** or **diskshadow**.
 - Exchange VSS backups to Local are simulated by running a **vshadow** or **diskshadow** persistent snapshot.
 - Exchange VSS backups to the Tivoli Storage Manager are simulated by running a **vshadow** or **diskshadow** nonpersistent snapshot.

- Exchange VSS backups to Local and to the Tivoli Storage Manager are simulated by running a **vshadow** or **diskshadow** persistent snapshot.
- Offloaded Exchange VSS backups to the Tivoli Storage Manager are simulated by running a **vshadow** or **diskshadow** nonpersistent, transportable snapshot.

See the VSHADOW documentation for the specific commands for performing backups.

If you can recreate the problem, it most likely is a general VSS issue. See the Microsoft Knowledge Database for information. If your operation passes successfully with **vshadow** or **diskshadow**, it most likely is a Tivoli Storage Manager or Data Protection for Exchange client problem.

For more information, see the Verifying VSS functionality for the Data Protection Exchange backup Technote: Verifying VSS functionality for the Data Protection Exchange backup.

Troubleshooting Data Protection for Exchange VSS and SAN Volume Controller, Storwize V7000, or DS8000

The troubleshooting tips included here are designed to help you accelerate your problem determination task.

The following areas are where you can troubleshoot when you are having VSS and SAN Volume Controller, Storwize V7000, or DS8000 problems:

- CIMOM (Common Information Model Object Manager) Connectivity issues

To verify connectivity to the CIMOM, perform the following steps:

1. Refer to your SAN Volume Controller, Storwize V7000, or DS8000 documentation.
2. Run the **IBMVCFG LIST** command. The default location is %Program Files%\IBM\Hardware Provider for VSS-VDS.
3. Issue the **IBMVCFG SHOWCFG** command to view the provider configuration information.
4. Check that the CIMOM is properly configured. Run `verifyconfig.bat -u username -p password` on the Master Console.
5. Check the username and password. If there is a problem with the truststore, follow the procedure in the documentation to generate a new truststore.
6. Set up the CIMOM properties file in non-SSL mode if you are using SAN Volume Controller, Storwize V7000, or DS8000 and you plan to use Instant Restore.

- CIMOM operational issues

If your backup or restore fails, check the IBMVSS.log file. If the failure is due to a CIMOM failure, the log displays output similar to the following example:

```
Wed Jan 11 17:34:34.793 - Calling AttachReplicas
Wed Jan 11 17:34:35.702 - AttachReplicas: 909ms
Wed Jan 11 17:34:35.702 - returnValue: 34561
Wed Jan 11 17:34:35.718 - AttachReplicas returned: 34561
java.util.MissingResourceException: Can't find resource for
bundle java.util.PropertyResourceBundle, key 1793
at java.util.ResourceBundle.getObject(ResourceBundle.java:329)
at java.util.ResourceBundle.getString(ResourceBundle.java:289)
at com.ibm.cim.CIMException.<init>(CIMException.java:472)
at ESSService.executeFlashCopy(ESSService.java:3168)
Wed Jan 11 17:34:35.779 - IBMVSS: AbortSnapshots
```

A return value of 0 means that it was successful. To determine why it failed, look at the log files generated by the CLI or graphical user interface (GUI), depending on how you run your operation. These might provide more information on the failure.

- Host configuration issues

If the failure seems to be for a different reason than a CIMOM failure, verify your configuration. Run the latest support levels of the software for SAN Volume Controller, Storwize V7000, or DS8000. Check the IBM Storage web site for details.

- Collecting logs in this environment

If you are unable to resolve these problems, provide the following information to IBM Support:

- Information listed in the Tivoli Storage Manager diagnostic information section
- HBA type, firmware and driver levels
- SDD version
- SAN Volume Controller microcode version (if applicable)
- DS8000 microcode version (if applicable)
- Storwize V7000 microcode version (if applicable)
- SAN Volume Controller or Storwize V7000 Master Console version (if applicable)
- For DS8000, the CIM Agent version (if applicable)
- IBMVSS.log
- Application Event Log
- System Event Log

If the problem appears related to CIMOM, you also need the CIMOM logs. Run CollectLogs.bat and send the file that is created (CollectedLogs.zip) to IBM Support. The default location for SAN Volume Controller or Storwize V7000 is C:\Program Files\IBM\svconsole\support, and the default location for DS8000 is C:\Program Files\IBM\cimagent.

Diagnosing VSS issues

Test VSS snapshots on your system.

The 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 results pane of the welcome 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. The results of the persistent and non-persistent snapshot testing displays as Passed or Failed.

4. Review the results of the snapshot testing and click **Next**. The final results of the persistent and non-persistent snapshot testing display as Success or Unsuccessful.
 - If the testing status is a success, click **Finish** and exit the wizard.
 - If the testing status is not successful, click **Previous** and review information in the Rule dialog.

Return to the Management window and begin backup operations.

For more in-depth details about troubleshooting of VSS operations, refer to the *Tivoli Storage Manager Problem Determination Guide*.

Viewing trace and log files

View files used during troubleshooting tasks.

Data Protection for Exchange 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:

- Data Protection for Exchange
 - Installation directory: C:\Program Files\Tivoli\FlashCopyManager
 - dserror.log
 - fcm.log
 - TraceFm.trc
 - TraceUx.trc
 - TraceManagedCapacityHistory.trc
 - TraceSchedLaunch.trc
 - VssProvisioning.log

Note: If the fcm.log is defined in a path other than the default c:\program files\tivoli\flashcopymanager\fcm.log, the reports will not include the following information for scheduled backup and restore operations:

- Task completion
- Type of data protection activity
- Amount of data protection activity

The charts and reports display only information that is present in the default log file fcm.log.

- Data Protection for Exchange
 - Installation directory: C:\Program Files\Tivoli\TSM\TDPEXchange
 - dserror.log
 - tdpexc.log
 - *TraceFileSql.trc*

Note: If the tdpexc.log is defined in a path other than the default c:\program files\tivoli\TSM\TDPEXchange\tdpexc.log the reports will not include task completion, type of data protection activity, and amount of data protection

activity for scheduled backup and restore operations. The charts and reports display only information that is present in the default log file `tdpexc.log`.

- VSS Requestor
 - Installation directory: `C:\Program Files\Tivoli\TSM\baclient`
 - `dsmerror.log`
- IBM VSS Provider for SAN Volume Controller, Storwize V7000, and DS8000
 - `IBMVDS.log`
 - `IBMVss.log`

Click the trace or log file that 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. Use the **E-mail Support Files** tool to send an email message containing the trace and log files. You can accomplish this from the **Actions** pane of **Trace and Log Files** page inside the **Diagnostics** view.

Tracing the Data Protection client when using VSS technology

You must gather traces for Data Protection for Exchange, the Tivoli Storage Manager application programming interface (API), and the DSMAGENT processes to ensure proper diagnosis of the Volume Shadow Copy Service (VSS) operation.

The following traces are the different traces to gather when you diagnose Data Protection for Exchange VSS operational problems:

Data Protection for Exchange trace

To create the trace flag, issue the `"/TRACEFILE"` and `"/TRACEFLAGS"` command-line options with the following example command:

```
TDPEXC BACKUP SG1 FULL /TRACEFILE=DPTRACE.TXT /TRACEFLAG=SERVICE
```

Enable tracing for FlashCopy Manager. See the *IBM Tivoli Storage FlashCopy Manager Installation and User's Guide* for information on how to enable tracing.

Tivoli Storage Manager API trace

Enable tracing with the DP/Exchange `dsm.opt` file and the `"TRACEFILE"` and `"TRACEFLAGS"` keywords. The following text is an example of the entry in the DP/Exchange `dsm.opt` file:

```
TRACEFILE APITRACE.TXT  
TRACEFLAG SERVICE
```

DSMAGENT trace

Enable tracing with the DSMAGENT `dsm.opt` file and the `"TRACEFILE"` and `"TRACEFLAGS"` keywords. The following text is an example of the entry in the DSMAGENT `dsm.opt` file:

```
TRACEFILE AGTTRACE.TXT  
TRACEFLAG SERVICE PID TID ENTER ALL_VSS SBRM RESTORE
```

The trace flag, in this instance, is `ALL_VSS` (you might need different traceflags, depending on the circumstance).

Exchange VSS Writer tracing

Event logging is the only extra tracing that can be turned on. Complete these steps to modify the level of event logging for the Exchange Store Writer:

1. Open the Exchange Management Console.
2. Find the server object.
3. Right-click the server on which you want to increase the logging level and click **Properties** or **Manage Diagnostic Logging Properties**, depending on the Exchange version.
4. Click the **Diagnostics Logging** tab.
5. Expand the **MSExchangeIS** node in the **Services** pane and click **System**.
6. Click **Exchange writer** in the **Categories** pane and select the desired logging level.
7. Click **Apply** and then **OK** to close the Properties dialog box.

Enable the Volume ShadowCopy service's debug tracing features in Windows server 2003 and Windows 2008

See the Microsoft tip for information on enabling debug tracing.

Gathering information about Exchange with VSS before calling IBM

The Data Protection client is dependent upon the operating system and the Exchange application. Collecting all the necessary information about the environment can significantly assist in determining the problem.

The Microsoft Management Console (MMC) is able to collect information and place it in a zip file that can then be provided to Support.

See “Email support files” on page 129 for more information about collecting information to send to IBM.

Gather as much of the following information as possible before contacting IBM Support:

- The exact level of the Windows operating system, including all service packs and hotfixes that were applied.
- The exact level of the Exchange Server, including all service packs and hotfixes that were applied.
- The exact level of Data Protection for Exchange with Volume Shadow Copy Service (VSS) Backup/Restore support.
- The exact level of the Tivoli Storage Manager API.
- The exact level of the Tivoli Storage Manager server.
- The exact level of the Tivoli Storage Manager backup-archive client.
- The exact level of the Tivoli Storage Manager storage agent (if LAN-free environment).
- The Tivoli Storage Manager server platform and operating system level.
- The output from the Tivoli Storage Manager server **QUERY SYSTEM** command.
- The output from the Data Protection for Exchange **TDPEXCC QUERY EXCHANGE** command.
- The device type (and connectivity path) of the Exchange databases and logs.
- (SAN only) The specific hardware that is being used. For example: HBA, driver levels, microcode levels, SAN Volume Controller or Storwize V7000 levels, DS8000 hardware details.
- Permissions and the name of the user ID being used to run backup and restore operations.

- The name and version of antivirus software.
- (SAN only) The VSS hardware provider level.
- The VSS hardware provider log files. See the documentation of the specific VSS hardware provider on how to enable tracing and collect the trace log files.
- (SAN only) The IBM CIM agent level for DS8000, SAN Volume Controller, or Storwize V7000.
- A list of vendor-acquired Exchange applications running on the system.
- A list of other applications running on the system.
- A list of the steps needed to recreate the problem (if the problem can be recreated).
- If the problem can not be recreated, list the steps that caused the problem.
- Is Data Protection for Exchange running in a Microsoft Cluster Server (MSCS) or Microsoft Failover Cluster environment?
- Is it an Exchange Server 2010 DAG or Exchange Server 2007 CCR, LCR, or SCR environment?
- Is the problem occurring on other Exchange servers?

Gathering files from Exchange with VSS before calling IBM

Several log files and other data can be collected for Data Protection for Exchange server diagnosis.

Gather as many of the following files as possible before contacting IBM Support:

- The contents of the C:\adsm.sys\vss_staging directory and subdirectories. Or gather the appropriate directories if you are using the VSSALTSTAGINGDIR option.
- The Data Protection for Exchange configuration file. The default configuration file is `tdpexc.cfg`.
- The Data Protection for Exchange Tivoli Storage Manager API options file. The default options file is `dsm.opt`.
- The Tivoli Storage Manager registry hive export.
- The Exchange Server registry hive export.
- The Tivoli Storage Manager Server activity log. The Data Protection client logs information to the server activity log. A Tivoli Storage Manager administrator can view this log for you if you do not have a Tivoli Storage Manager administrator user ID and password.
- If the Data Protection client is configured for LAN-free data movement, also collect the options file for the Tivoli Storage Manager storage agent. The default name for this file is `dsmsta.opt`.
- Any screen captures or command-line output of failures or problems.

Log files can indicate the date and time of a backup, the data that is backed up, and any error messages or completion codes that could help to determine your problem. The following files are the Tivoli Storage Manager log files that you can gather:

- The Data Protection for Exchange log file. The default location of this file is `C:\Program Files\Tivoli\TSM\TDPEXchange\tdpexc.log`
- The Tivoli Storage Manager API Error log file. The default location of this file is `C:\Program Files\Tivoli\TSM\TDPEXchange\dsierror.log`
- The DSMAGENT error log file. The default location of this file is `C:\Program Files\Tivoli\TSM\baclient\dsmerror.log`

- The DSMAGENT crash log file, if requested. The default location is C:\Program Files\Tivoli\TSM\baclient\dsmcrash.log.

The Windows event log receives information from the Exchange Server and many different components involved during a Volume Shadow Copy Service (VSS) operation. Export the event log into a text file format.

You can use the Data Protection for Exchange console to list the events originated by Data Protection for Exchange. Select **Dashboard - ServerName > Diagnostics > System Information** and double-click the dpevents.ps1 script in the PowerShell section of the **System Information** page.

On Windows Server 2008 and later, You can use PowerShell scripting to list the events information. You can also use the export function from within the Event Viewer to perform this function. The utility, by default, produces a tabular listing of all event log records in three sections (one section per event log type). Specify the type of event log you require by using one of the following /L parameters:

```
/L Application
/L Security
/L System
```

The following example generates output only for the application and system event logs:

```
cscript c:\windows\system32\eventquery.vbs /L Application >eq_app.out
cscript c:\windows\system32\eventquery.vbs /L System >eq_sys.out
```

You can use the /V parameter to receive detailed (verbose) output:

```
cscript c:\windows\system32\eventquery.vbs /V >eq.out
cscript c:\windows\system32\eventquery.vbs /L System /V >eq_sys.out
```

You can use the /FO parameter to specify tabular, list, or comma-separated (CSV) output. The following are the different methods of specifying the output:

```
/FO TABLE
/FO LIST
/FO CSV
```

The default format is TABLE. The LIST output puts each column of the record on a separate line, similar to how the Tivoli Storage Manager administrator's command-line interface (CLI) displays output when it is too wide for tabular display. The CSV output can be loaded into a spreadsheet or database tool for easier viewing. The following example generates a detailed CSV file of the application log:

```
cscript c:\windows\system32\eventquery.vbs /L Application /FO CSV /V >eq_app.out
```

You can get additional help information for the tool by using the following example:

```
cscript c:\windows\system32\eventquery.vbs /?
```

To increase the number of events logged by the Microsoft Exchange Writer, use the **Set-EventLogLevel** PowerShell cmdlet command. For more information on the **Set-EventLogLevel** PowerShell cmdlet command, see the Microsoft documentation.

The following VSS provider log files can also be helpful, if applicable:

- System Provider - (Windows Event Log)

- IBM System Storage SAN Volume Controller DS6000, IBM Storwize V7000, or DS8000 - %Program Files%\IBM\Hardware Provider for VSS\IBMVss.log
- NetApp - %Program Files%\SnapDrive*.log
- XIV - zip up all of the files in the C:\Windows\Temp\xProvDotNet directory

Email support files

Send diagnostic information to IBM support personnel.

The Email Support files feature collects all detected configuration, option, system information, trace, and log files. It also collects information about services, operating systems, and application versions. These files are compressed and then attached in an email.

Follow these steps to send diagnostic information to IBM support personnel:

1. Start the Management Console.
2. Click **Diagnostics** in the results pane of the welcome page. Click the **E-Mail Support files** icon in the action pane.
3. Enter the required information in the various fields and click **Done**. The information is sent to the designated support personnel and the dialog closes.

Files are collected, compressed, and stored in the flashcopymanager\problemdetermination folder. The files are deleted and replaced each time you email the support files. If the Email feature is not configured, or is blocked by a firewall, or if the files are too big, you can copy the files directly from this folder and transfer them to another site by using another method, such as FTP.

Online IBM support

Integrated web content is provided.

Search for the most current information regarding Data Protection for Microsoft Exchange Server at this website: <http://www.ibm.com/software/tivoli/products/storage-mgr-mail/>

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 on system components such as Data Protection for Exchange-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 doing the following steps:
 - a. Click **Diagnostics** in the results pane of the welcome page.
 - b. Double-click **System Information** in the results pane. A list of scripts is displayed in the results pane of the System Information view. The types of

scripts that are displayed are PowerShell scripts, Windows Management Instrumentation scripts, and Tivoli Storage Manager scripts.

2. Add, update, or delete your scripts.

- To add your own scripts, click **New** in the Actions pane. You can also copy your scripts directly to the ProgramFiles\Tivoli\FlashCopyManager\Scripts 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.

Chapter 8. Data Protection for Exchange performance overview

You can optimize the performance of your Exchange Server by tuning options that are related to Data Protection for Exchange, and by considering how certain issues affect performance.

Many factors can affect the backup and restore performance of your Exchange Server. Some of these, such as hardware configuration, network type, and capacity, are beyond the control of Data Protection for Exchange. These factors are not within the scope of this document. However, some options that are related to Data Protection for Exchange can be tuned for optimum performance. See “Specifying Data Protection for Exchange options” on page 47 for details regarding these options.

In addition, be aware of how the following issues affect performance:

- Backups to local shadow volumes eliminates the transfer of data to the Tivoli Storage Manager server.
- During VSS Backup processing, integrated Exchange integrity checking reads every page in the files to be backed up. As a result, backup processing time can be significant. You can specify the */skipintegritycheck* parameter to bypass integrity checking. This parameter is valid for all VSS Backups, only skip these checks in accordance with Microsoft’s recommendations.
- The time required to perform a snapshot ranges from seconds to minutes, depending on the type of VSS provider used. If an integrity check is run, it can delay the completion of the actual backup depending on the size of the database and log files.
- Backup-archive client settings can affect performance when backing up data to the Tivoli Storage Manager server. Therefore, make sure to review information provided in the “VSS Backup processing: Overview” on page 4 and “How Tivoli Storage Manager server policy affects Data Protection for Exchange” on page 29 sections.
- Performing Data Protection for Exchange VSS Backups from an Exchange Server 2007 passive node or from an Exchange Server 2010 DAG passive copy, can offload I/O and possibly CPU resources from the production server.

Buffering (Legacy only)

Data Protection for Exchange is a multithread application that uses asynchronous execution threads to transfer data between the Exchange servers and Tivoli Storage Manager servers. To accomplish this, multiple data buffers are used to allow one thread to receive data from one side, while another thread sends data to the other side.

For example, one thread reads data from an Exchange Server while another thread sends data to the Tivoli Storage Manager server. As a result, the Exchange Server continues sending data to available buffers regardless of the ability of the Tivoli Storage Manager server to receive the data.

Use the **Property** page to set preferences that affect performance.

Data Protection for Exchange **Buffers**: Specify a number from 2 to 8 that specifies the number of communication data buffers that Data Protection for Exchange uses when transferring data between it and the Tivoli Storage Manager server. Each buffer is the size that is specified by the Data Protection for Exchange **Buffer Size** option. This option applies to Legacy backup and restore operations only, and its default value is 3.

Data Protection for Exchange **Buffer Size**: Specify a number from 64 to 8192 that specifies the size of the buffers that are used by Data Protection for Exchange to transfer data to the Tivoli Storage Manager server. This option applies to Legacy backup and restore operations only, and its default value is 1024.

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

Exchange Buffer Size: Specify a number from 64 to 4096 that specifies the size of the buffers that are used by Data Protection for Exchange to transfer data from the Exchange Server to Data Protection for Exchange. This option applies to Legacy backups only.

Alternatively, the number and size of buffers can be specified using the *buffers* and *buffersize* parameters on the command-line interface.

LAN-free data movement

Running Data Protection for Exchange in a LAN-free environment allows data to be sent directly to storage devices.

As a result of implementing a LAN-free environment, data bypasses potential network congestion. However, you must be properly equipped to operate in a LAN-free environment. The *Tivoli Storage Manager Managed System for SAN Storage Agent User's Guide* provides detailed information about setting up a LAN-free environment.

In addition to specific LAN-free requirements, you must specify the *enablelanfree* option for Data Protection for Exchange to activate this LAN-free feature.

- For Legacy backups, specify *enablelanfree yes* in the Data Protection for Exchange options file.
- For VSS Backups, specify *enablelanfree yes* in the backup-archive client options file.

Chapter 9. Data Protection for Exchange reference

Data Protection for Exchange reference information is provided.

Command overview

The name of the Data Protection for Exchange command line interface is **tdpexcc.exe**. This program is located in the directory where Data Protection for Exchange is installed.

Using the Data Protection for Exchange command-line interface from the GUI

Follow these steps to launch the Data Protection for Exchange command-line interface:

1. Start the Data Protection for Exchange GUI.
2. Expand the **Protect and Recover Data** node.
3. In the tree view, select an Exchange Server 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 parameter characteristics

The command-line parameters have the following characteristics:

- 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 uppercase text.
- Some keyword parameters require a value.
- For those keyword parameters that require a value, the value is separated from the keyword with an equal sign (=).
- If a parameter requires more than one value after the equal sign, the values are separated with commas.
- Each parameter is separated from the others by using spaces.
- If a parameter value includes spaces, the value must be enclosed in double quotation marks.
- A positional parameter can appear only once per command invocation.

Command-line interface help

Issue the **tdpexcc ?** or **tdpexcc help** command to display help for the command-line interface.

Query Exchange command

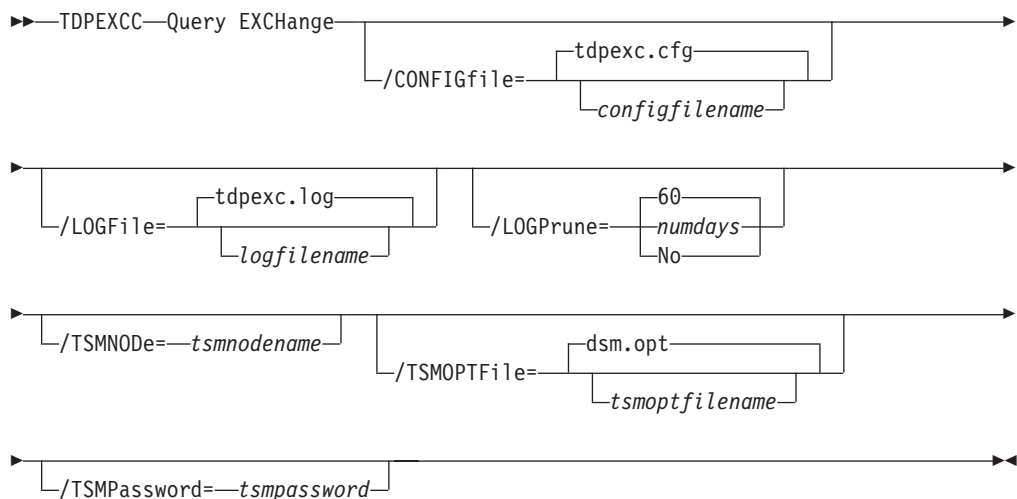
Use the **query EXCHange** command to query the local Exchange Server for general information.

The **query exchange** command returns the following information:

- Exchange Server name and version
- Domain name
- Names of all storage groups and databases
- Status (online, offline) of all storage groups and databases
- Recovery Storage Group status
- Circular logging status (enabled, disabled) of all storage groups
- VSS Information (only applicable when configured for VSS operations):
 - 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 Data Protection 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 Data Protection 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 214 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 Data Protection 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 Data Protection 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 Data Protection 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 Data Protection 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 Data Protection 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.

/TSMNODE=tsmnodename

Use the *tsmnodename* variable to refer to the Tivoli Storage Manager node name that Data Protection for Exchange 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 Data Protection for Exchange options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Data Protection for Exchange 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 Data Protection for Exchange uses to log on to the Tivoli Storage Manager server. If you specified PASSWORDACCESS GENERATE in the Data Protection for Exchange 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 Data Protection for Exchange 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 Data Protection for Exchange uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Query Exchange Example 1

This output example provides a sample of the text, messages, and process status that displays when using the **query exchange** command.

The **tdpexcc query exchange** command queries the Exchange server. An example of the output in a non-VSS environment is displayed below.

```
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.
```

Querying Exchange Server to gather component information, please wait...

Microsoft Exchange Server Information

Server Name: MALTA
Domain Name: malta.local
Exchange Server Version: 8.3.106.1 (Exchange Server 2007)

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
Public Folder Store Online

TSMRSG
Circular Logging - Disabled
Replica - None
Recovery - True
Mailbox Store Online

Recovery Storage Group exists - All legacy backups of mailbox databases are restored here.

Volume Shadow Copy Service (VSS) Information

Writer Name : Microsoft Exchange Writer
Local DSMAgent Node : MALTA
Remote DSMAgent Node :
Writer Status : Online
Selectable Components : 2

Completed

Query Exchange Example 2

This output example provides a sample of the text, messages, and process status that displays when using the **query exchange** command.

This **tdpexcc query exchange** command output example displays that a Recovery Storage Group exists and that all mailbox database will be restored to it.

```

The C:\Program Files\Tivoli\tsm\TDPEExchange\tdpexc.log
log file has been pruned successfully.

Querying Exchange Server to gather component information, please wait...
Microsoft Exchange Server Information
-----
Server Name:                MALTA
Domain Name:                malta.local
Exchange Server Version:    8.3.106.1 (Exchange Server 2007)
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
    Public Folder Store           Online
TSMRSG
Circular Logging - Disabled
Replica - None
Recovery - True
    Mailbox Store                  Online
Recovery Storage Group exists -
All legacy backups of mailbox databases are restored here.
Volume Shadow Copy Service (VSS) Information
-----
Writer Name                 : Microsoft Exchange Writer
Local DSMAgent Node         : MALTA
Remote DSMAgent Node        :
Writer Status                : Online
Selectable Components       : 2
Completed

```

Query Exchange Example 3

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 that is configured for VSS operations. 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.

Querying Exchange Server to gather storage group information, please wait...

Microsoft Exchange Server Information

Server Name: KEEN
Domain Name: keen.keen.local
Exchange Server Version: 8.0.728.0 (Exchange Server 2007)

Storage Groups with Databases and Status

First Storage Group
Circular Logging - Disabled
Replica - None
Recovery - False
Mailbox Database Online

LCR STG1
Circular Logging - Disabled
Replica - Local
Recovery - False
LCR1_mailbox Online

STG 20
Circular Logging - Disabled
Replica - None
Recovery - False
STG 20 mailbox Online

STG 21
Circular Logging - Disabled
Replica - None
Recovery - False
STG 21 mailbox Online

STG 23
Circular Logging - Disabled
Replica - None
Recovery - False
STG 23 mailbox Online

STG 25
Circular Logging - Disabled
Replica - None
Recovery - False
STG 25 mailbox Online

Volume Shadow Copy Service (VSS) Information

Please enter the password for node KEEN_EXCH:

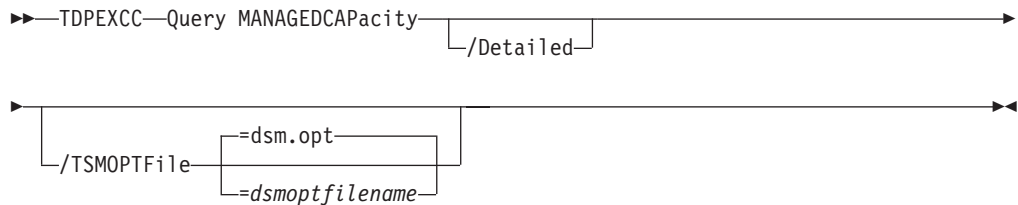
Writer Name : Microsoft Exchange Writer
Local DSMAgent Node : keen
Remote DSMAgent Node : keen
Writer Status : Online
Selectable Components : 7

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 Data Protection for Exchange. This command is valid for all Windows platforms supported by Data Protection for Exchange.



Parameters

/Detailed

Results in a detailed listing of snapped volumes. If this option is not specified then only the total capacity is displayed.

/TSMOPTFile=dsmoptfilename

The **/tsmoptfile** parameter specifies the Data Protection for Exchange options file to use.

Considerations:

- The *dsmoptfilename* variable can include a fully qualified path. If you do not include a path, the Data Protection for Exchange installation directory is used.
- If the *dsmoptfilename* variable spaces, enclose it in double quotation marks.
- If you do not specify **/tsmoptfile**, the default value is *dsm.opt*.
- If you specify **/tsmoptfile** but not *dsmoptfilename*, the default is also *dsm.opt*.

In this example, the **tdpexcc query managedcapacity** command displays the total amount of managed capacity in use in the local inventory. The following output is displayed:

```
Total Managed Capacity : 100.01 GB (107,381,026,816 bytes)

Volume                : D:
Managed Capacity : 100.01 GB (107,381,026,816 bytes)

Completed
```

In this example, the **tdpexcc query managedcapacity /detailed** command displays a detailed listing of total amount of managed capacity and the snapped volumes in use. The following output is displayed:

```
Total Managed Capacity : 1,019.72 MB (1,069,253,632 bytes)

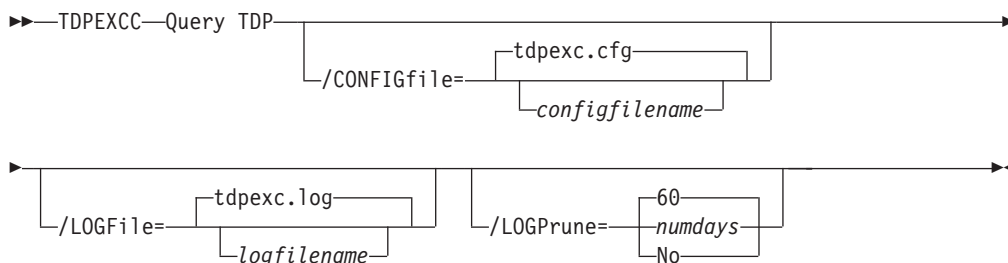
Volume                : I:
Managed Capacity : 1,019.72 MB (1,069,253,632 bytes)
```

Query TDP command

Use the **query tdp** command to query a list of the current values set in the configuration file for Data Protection 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 Data Protection 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 Data Protection 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 214 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 Data Protection 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 Data Protection 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 Data Protection 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 Data Protection 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 Data Protection 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.

The **tdpexcc query tdp** command queries the values that are set in the Data Protection for Exchange configuration file. An output in a Legacy configuration:

```
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.
```

Data Protection for Exchange Preferences

```
-----
BACKUPDESTination..... LOCAL
BACKUPMETHod..... VSS
BUFFers ..... 3
BUFFERSize ..... 1024
DATEformat ..... 1
LANGuage ..... ENU
LOCALDSMAgentnode..... MALTA
LOGFile ..... tdpexc.log
LOGPrune ..... 60
MOUNTWait ..... Yes
NUMBERformat ..... 1
REMOTEDSMAgentnode.....
RETRies..... 4
TEMPDBRestorepath.....
TEMPLOGRestorepath.....
TIMEformat ..... 1
```

Completed

An example of the output in a VSS configuration is displayed below.

```
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.
```

Data Protection for Exchange Preferences

```
-----
BACKUPDESTination..... TSM
BACKUPMETHod..... VSS
DATEformat ..... 1
LANGuage ..... ENU
LOCALDSMAgentnode..... testdp_agent
LOGFile ..... tdpexc.log
LOGPrune ..... 60
MAILBOXRESTOREUNREAD..... Yes
MOUNTWait ..... Yes
NUMBERformat ..... 1
REMOTEDSMAgentnode..... testdp_agent
TEMPDBRestorepath..... e:\Exchange\mailboxrestore
TEMPLOGRESTOREPath..... c:\account\templog
TIMEformat ..... 1
```

Query TSM command

Use the **query tsm** command to display Tivoli Storage Manager server information.

This command displays the following information:

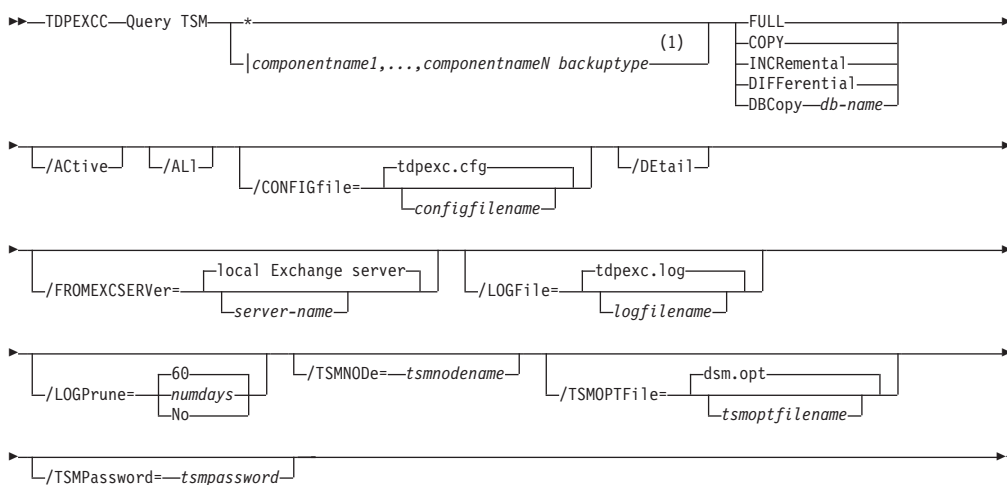
- Tivoli Storage Manager nodename
- Network host name of the server
- Tivoli Storage Manager API version
- Server name, type, and version
- Compression mode
- Domain

- Active policy set
- Default management class

This command can also display a list of backups that are stored on the Tivoli Storage Manager server that match the storage groups 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 TSM syntax

Use the **query TSM** command syntax diagrams as a reference to view available options and truncation requirements.



Notes:

- 1 Where **componentname** can be a storage group name for Exchange 2007 or a database name for Exchange 2010 or later.

Query TSM positional parameters

Positional parameters immediately follow the **query TSM** 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 Manager API and Tivoli Storage Manager server information is displayed:

*** | DIR | IS | componentname**

- * Query all backup objects for all storage groups (Exchange Server 2007) or databases (Exchange Server 2010 or later).

componentname

Query all backup objects for the specified storage group or database. Multiple entries are separated by commas.

The following positional parameters specify the type of backup to query. If this parameter is not specified, all backup types will be displayed:

FULL | COPY | INCRemental | DIFFerential | DBCOPY db-name

FULL Query only Full backup types

COPY Query only Copy backup types

INCRemental

Query only Incremental backup types

DIFFerential

Query only Differential backup types

DBCopy *db-name*

Query only database copy backups for database **db-name**.

Query TSM optional parameters

Optional parameters follow the **query TSM** command and positional parameters.

/Active

Use the **/active** parameter to display active backup objects only. This setting 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 Data Protection for Exchange configuration file that contains the values for the Data Protection for Exchange configuration options. See “Set command” on page 213 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 Data Protection 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 comprehensive information on the status of the Tivoli Storage Manager server, including the following details:

- Backup Compressed

Table 21. Backup Compressed values

Value	Status
Yes	One or more objects have been compressed.
No	No objects have been compressed.
Unknown	It is not known whether the backup has been compressed. This applies to backups prior to Data Protection for Exchange version 6.3.

- Backup Encryption Type

Table 22. Backup Encryption Type values

Value	Status
None	None of the objects have been encrypted.

Table 22. Backup Encryption Type values (continued)

Value	Status
AES-128	The objects have been encrypted with AES-128 encryption.
DES-56	The objects have been encrypted with DES-56 encryption.
Unknown	It is not known if the objects in the database are encrypted. This applies to backups prior to Data Protection for Exchange version 6.3.

- Backup Client-deduplicated

Table 23. Backup Client-deduplicated values

Value	Status
Yes	One or more objects have been client-side deduplicated.
No	No objects have been client-side deduplicated.
Unknown	It is not known whether the backup has been client-side deduplicated. This applies to backups prior to Data Protection for Exchange version 6.3.

- Backup Supports Instant Restore. This is only displayed in VSS backups.

Table 24. Backup Supports Instant Restore values

Value	Status
Yes	One or more objects support instant restore.
No	No objects support instant restore.
Unknown	It is not known whether the backup supports instant restore. This applies to backups prior to Data Protection for Exchange version 6.3.

/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 Data Protection 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 Data Protection 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 Data Protection 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 Data Protection 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 Data Protection 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.

/TSMNODE=tsmnodename

Use the *tsmnodename* variable to refer to the Tivoli Storage Manager node name that Data Protection for Exchange 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 Data Protection for Exchange options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Data Protection for Exchange 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 Data Protection for Exchange uses to log on to the Tivoli

Storage Manager server. If you specified PASSWORDACCESS GENERATE in the Data Protection for Exchange 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 Data Protection for Exchange 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 Data Protection for Exchange uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Query TSM Example 1

This output example provides a sample of the text, messages, and process status that displays when using the **query TSM** command.

The **tdpexcc query tsm** command displays information about the Tivoli Storage Manager API and Tivoli Storage Manager server. An example of the output is displayed below.

```
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.

Tivoli Storage Manager Server Connection Information
-----

Nodename ..... MALTA_EXC
NetWork Host Name of Server ..... GIJOE
TSM API Version ..... Version 6, Release 3, Level 0.57

Server Name ..... GIJOE_SERVER1_230
Server Type ..... Windows
Server Version ..... Version 6, Release 3, Level 0.0
Compression Mode ..... Client Determined
Domain Name ..... FCM_PDEXC
Active Policy Set ..... STANDARD
Default Management Class ..... STANDARD

Completed
```

Query TSM Example 2

This output example provides a sample of the text, messages, and process status that displays when using the **query TSM** command.

The **tdpexcc query tsm * /all** command displays information about the list of backups on the Tivoli Storage Manager server. An example of the output in a VSS configuration is displayed below.

```
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.

Querying Tivoli Storage Manager server for a list of database backups, please wait...

Connecting to TSM Server as node 'MALTA_EXC'...

Exchange Server   : MALTA
Storage Group     : First Storage Group

  Backup Date      Size      S Fmt  Type  Loc Object Name/Database Name
  -----
08/30/2011 23:36:26 13.00MB A VSS  incr  Srv 20110830233626
                                13.00MB                                Logs

Exchange Server   : MALTA
Storage Group     : 2nd Storage Grp Basic

  Backup Date      Size      S Fmt  Type  Loc Object Name/Database Name
  -----
08/31/2011 06:48:38 22.05MB A Lgcy  full  Srv 20110831064838
                                4,120.19KB 2nd MB Multiple User
                                10.02MB 2nd MB Single User
                                8,193.12KB Logs

Completed
```

Query TSM Example 3

This output example provides a sample of the text, messages, and process status that displays when using the **query TSM** command.

The **tdpexcc query tsm "First Storage Group" full /all /fromexcserver=WIN2008SP2DEV2** command displays information about the list of backups on the Tivoli Storage Manager server. An example of the output in a VSS configuration is displayed below.

```

tdpexcc query tsm * /detail

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.

Querying Tivoli Storage Manager server for a list of database backups, please wait...

Connecting to TSM Server as node 'EXC_TDP'...

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 ..... 09/22/2011 20:31:08
Backup Compressed ..... No
Backup Encryption Type ..... None
Backup Client-deduplicated ..... No
Backup Supports Instant Restore ..... No
Backup Object Size / Name ..... 19.02MB / 20110922203108
Backup Object Size / Name ..... 11.01MB / Logs
Backup Object Size / Name ..... 8,208.00KB / Mailbox Database

Backup Object Information
-----

Exchange Server Name ..... WIN2008SP2DEV2
Backup Storage Group Name ..... First Storage Group
Backup Method ..... Lgcy
Backup Location ..... Srv
Backup Object Type ..... full
Backup Object State ..... Active
Backup Creation Date / Time ..... 09/23/2011 15:14:33
Backup Compressed ..... Yes
Backup Encryption Type ..... None
Backup Client-deduplicated ..... Yes
Backup Object Size / Name ..... 15.02MB / 20110923151433
Backup Object Size / Name ..... 8,216.17KB / Mailbox Database
Backup Object Size / Name ..... 7,169.06KB / Logs

```

Backup command

Use the **backup** command to perform Exchange Server storage group backups from the Exchange Server to Tivoli Storage Manager server storage.

You must have local registry rights (for all versions of Exchange Server) to perform a Data Protection for Exchange backup. Use the */excappliation* option when backing up this databases.

When a full Legacy backup is performed, all active Legacy backups previous to this full backup are automatically inactivated for the particular storage group that is being backed up.

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 (created for back up to local shadow volumes) is

performed, the backup remains active until the backup version is expired on the Tivoli Storage Manager server according to the defined server policy. As a result, five different active backups can exist at the same time:

- Legacy
- VSS local (full)
- VSS local (copy)
- VSS Tivoli Storage Manager server (full)
- VSS Tivoli Storage Manager server (copy)

Note: 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.

For SAN Volume Controller and Storwize V7000 storage subsystems, only one backup is allowed to occur while the background copy process is pending. A new backup is not performed until the background copy process for the previous backup completes. As a result, local backups for SAN Volume Controller and Storwize V7000 storage subsystems should be initiated at a frequency greater than the time required for the background copy process to complete.

See “Backup strategies” on page 32 for additional information related to the **backup** command.

Data Protection for Exchange supports the following types of backup:

Full (Legacy and VSS)

Back up the entire storage group and transaction logs, and if a successful integrity check and backup is obtained, the Exchange Server deletes the committed log files.

Incremental (Legacy and VSS)

Back up the transaction logs, and if a successful integrity check and backup is obtained, the Exchange Server deletes the committed log files.

Differential (Legacy and VSS)

Back up the transaction logs but do NOT delete them

Copy (Legacy and VSS)

Back up the entire storage group and transaction logs, do NOT delete the transaction logs

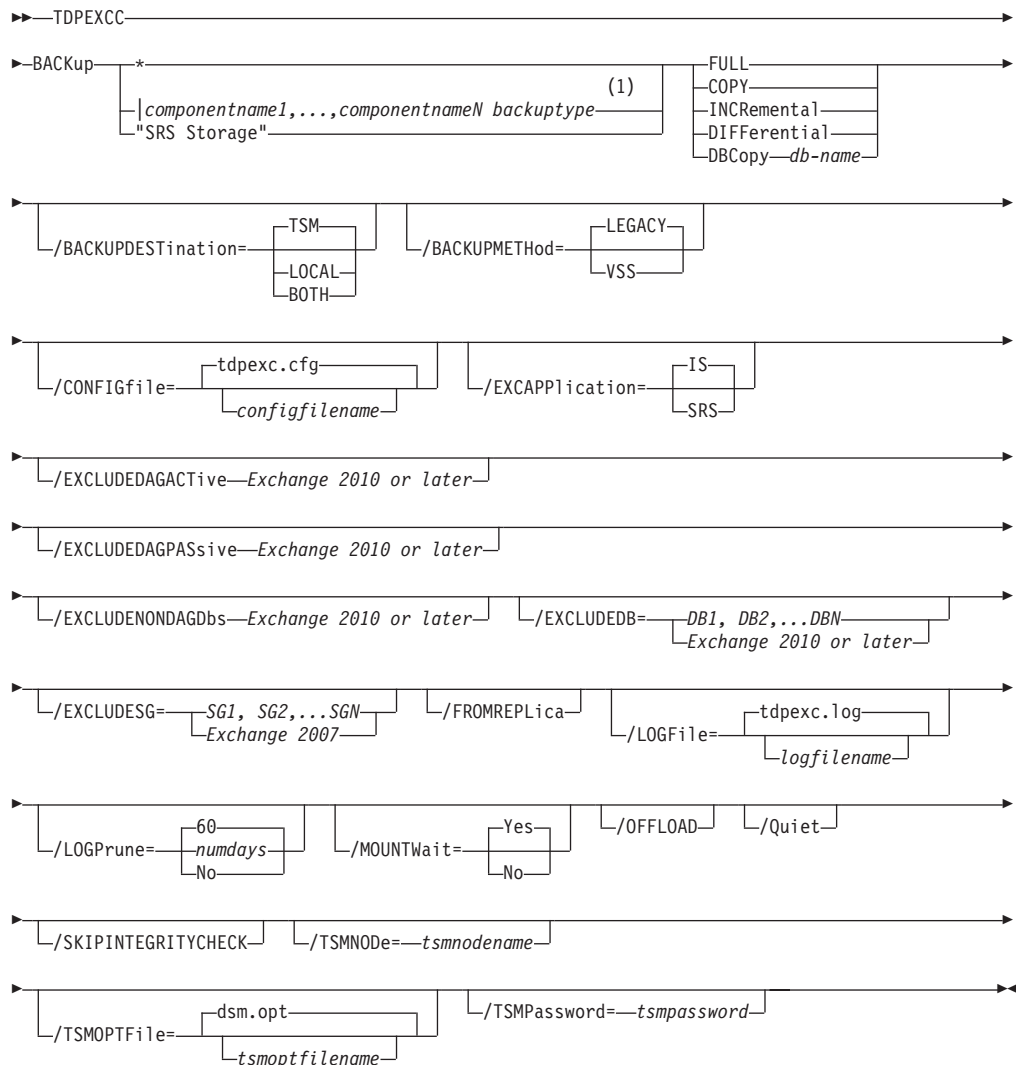
Database Copy (Legacy only)

Back up only the specified database and transaction logs, do NOT delete the transaction logs

Note: If there are databases within a storage group that are not mounted at the time of the backup, the transaction logs will NOT be deleted.

Backup syntax

Use the **backup** command syntax diagrams as a reference to view available options and truncation requirements.



Notes:

- 1 **Componentname** can be a storage group name for Exchange 2007, or a database name for Exchange 2010 or later.

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 backuptype*

* Back up all storage groups (2007) or databases (Exchange Server 2010) sequentially.

sg-or-db-name

Back up the specified storage group (Exchange Server 2007) or

database (Exchange Server 2010). If separated by commas, make sure there is no space between the comma and the storage group name. If any storage group contains commas or blanks, enclose the storage group name in double quotation marks.

The following positional parameters specify the type of backup to perform:

FULL | COPY | INCRemental | DIFFerential | DBCopy *db-name*

FULL (Legacy and VSS)

Back up the entire storage group and transaction logs, and if a successful backup is obtained, truncate the transaction logs.

COPY (Legacy and VSS)

Back up the entire storage group and transaction logs, 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.

DBCOPY *db-name* (Legacy only)

Back up only the specified database and transaction logs, do NOT truncate the transaction logs. Note that this type of backup is not available with a VSS snapshot backup.

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.

/BACKUPDESTination=TSM|LOCAL|BOTH

Use the **/backupdestination** parameter to specify the location where the backup is stored.

You can specify:

TSM The backup is stored on Tivoli Storage Manager server storage only. This is the default value.

LOCAL

The backup is stored on local shadow volumes only. This is only valid when the **/backupmethod** parameter specifies **VSS**.

BOTH The backup is stored on Tivoli Storage Manager server storage and local shadow volumes. This is only valid when the **/backupmethod** parameter specifies **VSS**.

/BACKUPMETHod=LEGACY|VSS

Use the **/backupmethod** parameter to specify the manner in which the backup is performed.

You can specify:

LEGACY

The backup is performed with the legacy API. This is the Exchange

streaming backup and restore API as used in previous versions of Data Protection for Exchange. This is the default value for Exchange Server 2007. This method is unavailable for Exchange Server 2010.

VSS The backup is performed with VSS. This is the only method available for Exchange Server 2010.

/BUFFers=numbuffers

Use the **/buffers** parameter to specify the number of data buffers that are used for moving data between the Exchange Server and the Tivoli Storage Manager API during Legacy backup and restore operations. Separate, asynchronous execution threads are used by Data Protection for Exchange for communicating with the Exchange Server and Tivoli Storage Manager APIs. Increasing the number of data buffers improves throughput by reducing the possibility of one thread having to wait for another thread.

The *numbuffers* variable refers to the number of data buffers to use. The number of data buffers can be from 2 to 8. The default number of data buffers is 3.

/BUFFERSize=buffer size

Use the **/buffer size** parameter to specify the size of data buffers that are used to move data between the Exchange Server and the Tivoli Storage Manager API during Legacy backup and restore operations.

The *buffer size* variable refers to the size of the data buffers in kilobytes. The size of the data buffers can be from 64 to 8192 kilobytes and must be a multiple of 8. For example, you can specify 312 (a multiple of 8) but you cannot specify 313. The default size of the data buffers is 1024 kilobytes.

/CONFIGfile=configfilename

Use the **/configfile** parameter to specify the name (*configfilename*) of the Data Protection 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 Data Protection 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 214 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 **/excludenondagdb**s parameter to exclude the Exchange Server 2010 databases from backup if they do not belong to a Database Availability Group.

/EXCLUDEDDB=db-name,...

(Exchange Server 2010) Use the **/excludedb** parameter to exclude the specified Exchange Server 2010 databases from the backup operation.

/EXCLUDESG=sg-name,...

(Exchange Server 2007) Use the **/excludesg** parameter to exclude the specified storage groups from the backup operation. This parameter is available for all VSS and Legacy backup types.

/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. This parameter is available for VSS Backups only.

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 Data Protection 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 Data Protection 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 Data Protection 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 Data Protection 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 Data Protection 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.

/MOUNTWait=Yes|No

Use the **/mountwait** parameter to specify whether Data Protection for Exchange should wait for removable media to mount (such as tapes or CDs) or to stop the current operation. This situation occurs when the Tivoli Storage Manager server is configured to store backup data on removable media and waits for a required storage volume to be mounted.

You can specify:

Yes Wait for tape mounts. This is the default.

No Do not wait for tape mounts.

/OFFLOAD

Specify this parameter to perform the integrity check and backup of files to Tivoli Storage Manager on the machine specified by the **remotedsmagentnode** instead of the local machine. This parameter is **ONLY** valid when **/backupmethod=VSS** and **/backupdestination=TSM**. Note that this parameter requires a VSS provider that supports transportable shadow copies. It is not supported with the default Windows VSS System Provider.

/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. During VSS Backup processing, integrated Exchange integrity checking reads every page in the files to be backed up. As a result, backup processing time can be significant. You can specify the **/skipintegritycheck** parameter to bypass integrity checking. This parameter is valid for all VSS Backups, only skip these checks in accordance with Microsoft's recommendations.

Note:

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 stored on Tivoli Storage Manager server storage.

/TSMNODE=tsmnodename

Use the *tsmnodename* variable to refer to the Tivoli Storage Manager node

name that Data Protection for Exchange 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 Data Protection for Exchange options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Data Protection for Exchange 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 Data Protection for Exchange uses to log on to the Tivoli Storage Manager server. If you specified PASSWORDACCESS GENERATE in the Data Protection for Exchange 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 Data Protection for Exchange 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 Data Protection for Exchange uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Backup Example 1

This output example provides a sample of the text, messages, and process status that displays when using the **backup** command.

This **tdpexcc backup "First Storage Group" incremental** command performs an incremental backup of the Exchange Server storage group *First Storage Group* to Tivoli Storage Manager server storage. An example of the output is displayed below.

```

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 storage group backup...
Connecting to TSM Server as node 'TREELO_EXCH'...

Beginning incr backup of First Storage Group, 1 of 1.
Full: 0   Read: 10485970   Written: 10485970   Rate: 1,623.63 Kb/Sec
Backup of First Storage Group completed successfully.

Total storage groups requested for backup: 1
Total storage groups backed up: 1
Total storage groups expired: 0
Total storage groups excluded: 0
Total storage groups deduplicated: 0

Throughput rate: 1,581.50 Kb/Sec
Total bytes inspected: 28,362,002
Total bytes transferred: 10,485,970
LanFree bytes transferred: 0
Total bytes before deduplication: 0
Total bytes after deduplication: 0
Data compressed by: 0.00%
Deduplication reduction: 0.00%
Total data reduction ratio: 0.00%
Elapsed processing time: 6.47 Secs

```

Backup Example 2

This output example provides a sample of the text, messages, and process status that displays when using the **backup** command.

This **tdpexcc backup "First Storage Group" copy** command performs a copy backup of Exchange Server storage group *First Storage Group* using VSS. An example of the output is displayed below.

```

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.

Querying Exchange Server to gather storage group information, please wait...

Connecting to TSM Server as node 'TREELO_EXCH'...
Connecting to Local DSM Agent 'treelo_agent'...
Starting storage group backup...

Beginning VSS backup of 'First Storage Group'...

Preparing to backup using snapshot.
Executing system command: Exchange integrity check for storage group 'First Stor
age Group'
  Files Examined/Completed/Failed: [ 13 / 13 / 0 ]   Total Bytes: 3698667

VSS Backup operation completed with rc = 0
Files Examined           : 24
Files Completed          : 24
Files Failed             : 0
Files Deduplicated       : 0
Total Bytes Inspected    : 27335003
Total Bytes              : 27335003
Total LanFree Bytes      : 0
Total Bytes Before Deduplication : 0
Total Bytes After Deduplication : 0
Files Compressed By      : 0.00%
Deduplication Reduction  : 0.00%
Total Data Reduction Ratio : 0.00%

```

Backup Example 3

This output example provides a sample of the text, messages, and process status that displays when using the **backup** command.

The **tdpexcc backup stg1 full /backupdestination=tsm /backupmethod=vss** command performs a full VSS Backup of storage group *stg1* to Tivoli Storage Manager server storage. An example of the output is displayed below.

```

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.

Querying Exchange Server to gather storage group information, please wait...

Connecting to TSM Server as node 'TREELO_EXCH'...
Connecting to Local DSM Agent 'treelo_agent'...
Starting storage group backup...

Beginning VSS backup of 'stg1'...

Preparing to backup using snapshot.
Executing system command: Exchange integrity check for storage group 'stg1'
Files Examined/Completed/Failed: [ 14 / 14 / 0 ] Total Bytes: 4156788

VSS Backup operation completed with rc = 0
Files Examined           : 24
Files Completed          : 24
Files Failed             : 0
Files Deduplicated       : 0
Total Bytes Inspected    : 27335003
Total Bytes              : 27335003
Total LanFree Bytes      : 0
Total Bytes Before Deduplication : 0
Total Bytes After Deduplication : 0
Files Compressed By      : 0.00%
Deduplication Reduction  : 0.00%
Total Data Reduction Ratio : 0.00%

```

Backup Example 4

This output example provides a sample of the text, messages, and process status that displays when using the **backup** command.

The **tdpexcc backup "First Storage Group",CT_TREELO2 full /backupdestination=local /backupmethod=vss** command performs a full VSS Backup of storage group *First Storage Group* to local shadow volumes. Note that in VSS Backup processing, if the databases are dismounted, the storage group that contains the databases is not backed up. As a result, only *First Storage Group* is backed up in the output example displayed below.

```

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.

Querying Exchange Server to gather storage group information, please wait...

ACN5072W Databases in storage group <CT_TREELO2> are dismounted -- skipping.

Connecting to TSM Server as node 'TREELO_EXCH'...
Connecting to Local DSM Agent 'treelo_agent'...
Starting storage group backup...

Beginning VSS backup of 'First Storage Group'...

Preparing to backup using snapshot.
Executing system command: Exchange integrity check for storage group 'First Stor
age Group'
  Files Examined/Completed/Failed: [ 6 / 6 / 0 ]   Total Bytes: 9093

VSS Backup operation completed with rc = 0
Files Examined           : 24
Files Completed          : 24
Files Failed             : 0
Files Deduplicated       : 0
Total Bytes Inspected    : 27335003
Total Bytes              : 27335003
Total LanFree Bytes      : 0
Total Bytes Before Deduplication : 0
Total Bytes After Deduplication : 0
Files Compressed By      : 0.00%
Deduplication Reduction  : 0.00%
Total Data Reduction Ratio : 0.00%

```

Backup Example 5

This output example provides a sample of the text, messages, and process status that displays when using the **backup** command.

The **tdpexcc backup * copy /backupdestination=both /backupmethod=vss** command performs a copy VSS Backup of storage groups *LCR STG1*, *STG 20*, *STG 21*, *First Storage Group*, *STG 25*, and *STG 23* to local shadow volumes and to Tivoli Storage Manager server storage. An example of the output is displayed below.


```

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.

Please enter the password for node KEEN_EXCH:

*****
Querying Exchange Server to gather storage group information, please wait...

Connecting to TSM Server as node 'KEEN_EXCH'...
Connecting to Local DSM Agent 'keen'...
Starting storage group backup...

Beginning VSS backup of 'LCR STG1', 'STG 20', 'STG 21', 'STG 25', 'ST
G 23'...

Preparing to backup using snapshot.
Executing system command: Exchange integrity check for storage group 'STG 20'
Executing system command: Exchange integrity check for storage group 'STG 21'
Executing system command: Exchange integrity check for storage group 'LCR STG1'
Executing system command: Exchange integrity check for storage group 'STG 25'
Executing system command: Exchange integrity check for storage group 'STG 23'
Files Examined/Completed/Failed: [ 81 / 81 / 0 ] Total Bytes: 240292

VSS Backup operation completed with rc = 0
Files Examined           : 24
Files Completed           : 24
Files Failed              : 0
Files Deduplicated        : 0
Total Bytes Inspected     : 27335003
Total Bytes               : 27335003
Total LanFree Bytes       : 0
Total Bytes Before Deduplication : 0
Total Bytes After Deduplication : 0
Files Compressed By       : 0.00%
Deduplication Reduction   : 0.00%
Total Data Reduction Ratio : 0.00%

```

Backup Example 6

This output example provides a sample of the text, messages, and process status that displays when using the **backup** command.

The **tdpexcc backup "LCR STG1" copy /backupdestination=local /backupmethod=vss /fromreplica** command performs a copy VSS Backup of storage group *LCR STG1* from an available replica copy to local shadow volumes. An example of the output is displayed below for the command **tdpexcc query tsm * /fromexccserver=keen /al**.

```

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.

Querying Tivoli Storage Manager server for a list of database backups, please wait.
Connecting to TSM Server as node 'KEEN_EXCH'...
Please enter the password for node KEEN_EXCH:

*****

                                Backup List
                                -----

Exchange Server   : KEEN

Storage Group     : LCR STG1

Backup Date       Size      S Fmt  Type  Loc Object Name/Database Name
-----
07/07/2008 12:24:26 12.02MB A VSS  full  Srv 20080707122426
      8,200.00KB
      4,112.00KB
07/13/2008 06:26:13 9,240.00KB A VSS  copy  Loc 20080713062613 (Replica)
      5,128.00KB
      4,112.00KB
                                Logs
                                LCR1_mailbox

```

Restore command

Use the **restore** command to restore a storage group backup from Tivoli Storage Manager storage to an Exchange Server.

You must have local registry rights (for all versions of Exchange Server) to perform a Data Protection for Exchange restore. Use the */lexapplication* option when restoring these databases.

VSS operations require special considerations that must be reviewed before attempting a VSS Restore. See these two sections for important guidelines:

- “VSS restore considerations” on page 165
- “Restoring VSS Backups into alternate locations” on page 26

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 in Tivoli Storage Manager storage. You can issue a **tdpexcc query tsm *** command to obtain a list of the object names.

Note: If the **tdpexcc restore sname 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.

- **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. If this occurs, for Legacy backups 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.

- Specify `/mountdatabases=yes` if you are restoring the last backup set and you want the databases within the storage group automatically mounted after the recovery completes. Note that when performing a Legacy restore of mailbox databases to a Recovery Storage Group, the mailbox databases will be restored to the Recovery Storage Group (when a Group exists) and that the original databases will *not* be dismounted. Only transaction logs that are contained in the backup will be applied to the mailbox database when performing a Recovery Storage Group restore. You must specify `/recover=applyrestoredlogs` when restoring a mailbox database to a Recovery Storage Group or the restore operation may fail.
- 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>

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.

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.

Important:

If the Windows event log, Data Protection for Exchange log file, or a command error indicates that a restore operation failed, this failure might be caused by the `restore.env` file remaining behind. This file is created by the Microsoft restore interface and is used for debugging the restore failure. This file is named `Ennrestore.env` where *Enn* is the base name of the restored transaction log files. Once the restore error is resolved, remove any remaining `restore.env` files before attempting the next restore operation. See the following Microsoft Exchange documentation for further details:

- <http://msdn.microsoft.com/en-us/library/bb204044.aspx>
- [http://technet.microsoft.com/en-us/library/aa996770\(EXCHG.65\).aspx](http://technet.microsoft.com/en-us/library/aa996770(EXCHG.65).aspx)

Data Protection for Exchange supports the following types of restore:

Full (Legacy and VSS)

Restore a Full type backup

Copy (Legacy and VSS)

Restore a Copy type backup

Incremental (Legacy and VSS)

Restore an Incremental type backup

Differential (Legacy and VSS)

Restore a Differential type backup

Database copy (Legacy only)

Restore a Database Copy type backup.

VSS restore considerations

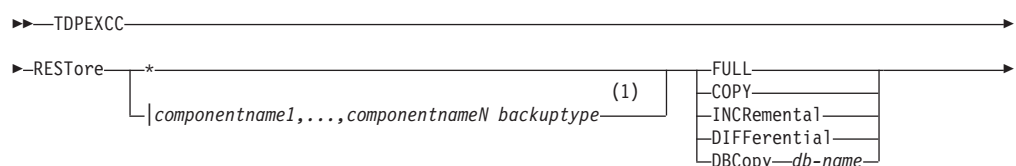
Be aware of these considerations when performing VSS restores.

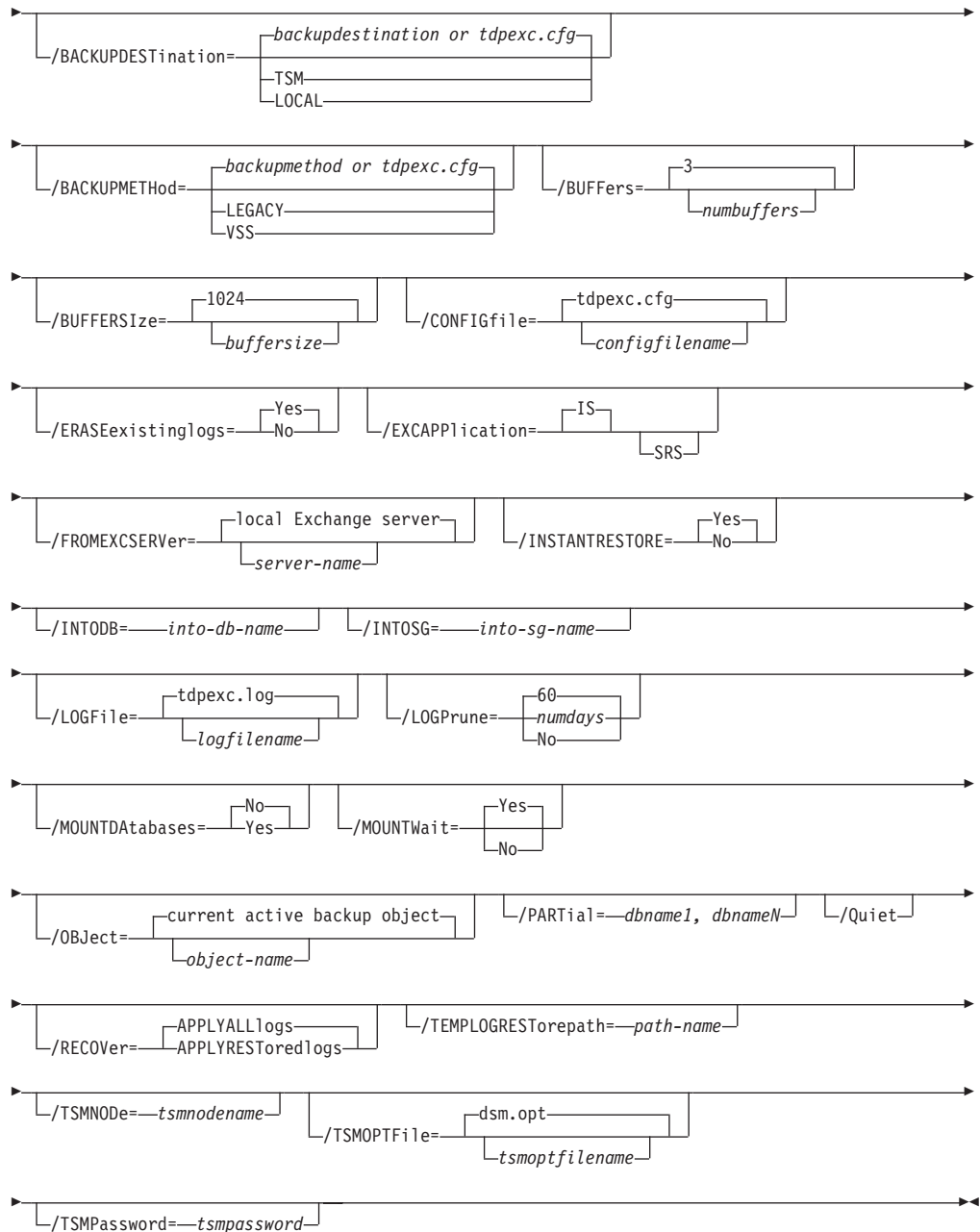
Unless otherwise specified, "VSS restores" refers to all restore types that use VSS (VSS Restore, VSS Fast Restore, VSS Instant Restore):

- Be aware that all VSS Restores of CCR and LCR, or DAG replicas can only be restored into the running instance of a storage group or database (primary, recovery, or alternate). Microsoft does not support VSS Restores into a replica instance.
- VSS restores ignore the Recovery Storage Group (Exchange Server 2007) or Recovery Database (Exchange Server 2010) and are placed directly into the production database unless the */intosg* or */intodb* 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.
- Unlike Legacy restores (which only dismount the database being restored), VSS restores dismount *all* databases in the storage group that is being restored.
- VSS restores require all databases in the restored storage group (Exchange Server 2007) or database (Exchange Server 2010) to be dismounted. This is also required when the */partial* parameter is used when restoring a single database.
- 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 restore from local shadow volumes is performed, the bytes transferred will display "0". That is because no data ("0") is restored from the Tivoli Storage Manager server.
- Do not set the ASNODENAME option in the dsm.opt file when using Data Protection for Microsoft Exchange Server. Setting ASNODENAME can cause VSS backups and VSS restores to fail.
- Single Copy Cluster (SCC) local backups can be restored to other nodes in the cluster. Cluster Continuous Replication (CCR) local backups can only be restored to the node that performed the backup.

Restore syntax

Use the **restore** command syntax diagrams as a reference to view available options and truncation requirements.





Notes:

- 1 Where **componentname** can be a storage group name for Exchange 2007, or a database name for Exchange 2010 or later.

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 backuptype**

***** Restore all component names sequentially.

sg-or-db-name

Restore the specified storage group for Exchange Server 2007, or database for Exchange Server 2010 or later. Multiple entries are separated by commas. If separated by commas, make sure there is no space between the comma and the storage group name. If any storage group contains commas or blanks, enclose the storage group name in double quotation marks.

The following positional parameters specify the type of restore to perform:

FULL | COPY | INCRemental | DIFFerential | DBCopy *db-name*

FULL (Legacy and VSS)

Restore a Full type backup

COPY (Legacy and VSS)

Restore a Copy type backup

INCRemental (Legacy and VSS)

Restore an Incremental type backup

DIFFerential (Legacy and VSS)

Restore a Differential type backup

DBCOPY *db-name* (Legacy only)

Restore the *db-name* database copy backup.

Restore optional parameters

Optional parameters follow the **restore** command and positional parameters.

/BACKUPDESTination=TSM|LOCAL

Use the **/backupdestination** parameter to specify the location from where the backup is to be restored. The default is the value (if present) specified in the Data Protection for Exchange preferences file (tdpexc.cfg). If no value is present, the backup is restored from Tivoli Storage Manager server storage.

You can specify:

TSM The backup is restored from Tivoli Storage Manager server storage. This is the default value.

LOCAL

The backup is restored from the local shadow volumes.

/BACKUPMETHod=LEGACY|VSS

Use the **/backupmethod** parameter to specify the manner in which the restore is performed. The default is the value (if present) specified in the Data Protection for Exchange preferences file (tdpexc.cfg). If no value is present, the backup is restored with the legacy API.

You can specify:

LEGACY

The restore is performed with the legacy API. This is the default value for Exchange Server 2007 if no value is specified in the Data Protection for Exchange preferences file (tdpexc.cfg). This method is unavailable for Exchange Server 2010.

VSS The restore is performed with VSS. This is the only method available for Exchange Server 2010.

/BUFFers=*numbuffers*

Use the **/buffers** parameter to specify the number of data buffers that are used for moving data between the Exchange Server and the Tivoli Storage Manager API during Legacy restore operations. Separate, asynchronous execution threads are used by Data Protection for Exchange for communicating with the Exchange Server and Tivoli Storage Manager APIs. Increasing the number of data buffers improves throughput by reducing the possibility of one thread having to wait for another thread.

The *numbuffers* variable refers to the number of data buffers to use. The number of data buffers can be from 2 to 8. The default number of data buffers is 3.

/BUFFERSize=*buffersize*

Use the **/buffersize** parameter to specify the size of data buffers that are used to move data between the Exchange Server and the Tivoli Storage Manager API during Legacy backup and restore operations.

The *buffersize* variable refers to the size of the data buffers in kilobytes. The size of the data buffers can be from 64 to 8192 kilobytes and must be a multiple of 8. For example, you can specify 312 (a multiple of 8) but you cannot specify 313. The default size of the data buffers is 1024 kilobytes.

/CONFIGfile=*configfilename*

Use the **/configfile** parameter to specify the name of the Data Protection for Exchange configuration file that contains the values for the Data Protection for Exchange configuration options. See "Set command" on page 213 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 Data Protection 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"
```

/ERASEexistinglogs=YES|NO

Use the **/eraseexistinglogs** parameter to erase the existing transaction log files for the database being restored before restoring the specified database(s). If you do not erase existing data, then any existing transaction logs could be reapplied when the Exchange databases are mounted. This parameter is valid only when restoring a VSS FULL or VSS COPY backup of Exchange Server storage groups or databases.

/EXCAPplication=SRS

Use the **/excapplication** parameter to specify the name of the SRS database to be restored. Specify *SRS* for the Site Replication Service database to be restored. If no value is specified, Data Protection for Exchange restores the Information Store database.

/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. Note that a SAN Volume Controller, Storwize V7000, DS6000, or DS8000 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 database files, log files, and the checkpoint file are the only data overwritten on the source volumes.

When performing VSS Instant Restores, you must 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.

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

When performing a VSS Instant Restore in a Database Availability Group (DAG) environment, do not choose the option that automatically mounts the databases after the recovery is completed. As described in the Database Availability Group considerations section, in order to perform the VSS Instant Restore for databases in a DAG environment, you must stop the Microsoft Exchange Replication service prior to performing the VSS Instant Restore or the restore will fail. In this case, after the VSS Instant Restore is completed, start the Microsoft Exchange Replication service and then finally mount the database.

/INTODB=into-db-name

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 *into-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 would be 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 Maildb1 is the name of the relocated database that is being restored, the command-line entry would be as follows:

```
TDPEXCC RESTore Maildb1 FULL /INTODB=Maildb1
```

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.
- Note that the **/intodb** parameter is only available with Exchange Server 2010.

/INTOSG=*into-sg-name*

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 *into-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 would be as follows:

```
TDPEXCC RESTore STG1 FULL /INTOSG=RSG /BACKUPMETHod=vss  
/BACKUPDESTination=local
```

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 would be as follows:

```
TDPEXCC RESTore STG1 FULL /INTOSG=STG1 /BACKUPMETHod=vss  
/BACKUPDESTination=local
```

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.
- Note that the **/intosg** parameter is only available with Exchange Server 2007 VSS restore operations.

/LOGFile=*logfile*

Use the **/logfile** parameter to specify the name of the activity log file that is generated by Data Protection for Exchange.

The *logfile* 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 *logfile* variable can include a fully-qualified path. However, if no path is specified, the log file is written to the Data Protection for Exchange installation directory.

If the *logfile* 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 Data Protection 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 Data Protection 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 Data Protection 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, 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>

/MOUNTWait=Yes | No

Use the **/mountwait** parameter to specify whether Data Protection for Exchange should wait for removable media to mount (such as tapes or CDs) or to stop the current operation. This situation occurs when the Tivoli Storage Manager server is configured to store backup data on removable media and waits for a required storage volume to be mounted.

You can specify:

- | | |
|------------|--|
| 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 you want to restore. The object name uniquely identifies each backup object and is created by Data Protection for Exchange.

Use the Data Protection for Exchange **query tsm** command to view the names of the backup objects.

If the **tdpexcc restore sname 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.

/PARTial=dbname1,dbnameN

Use the **/partial** parameter to specify that only the named databases (*dbname1,dbnameN*) within the *full* or *copy* backup should be restored.

Considerations

- If you specify this option, you must include at least one valid database name.
- If you do not specify this option, all databases within the backup are restored.
- You cannot specify this parameter while using VSS Instant Restore. You must restore ALL databases within the specified storage group when performing a VSS Instant Restore. Although Data Protection for Exchange allows this operation to begin, it will either fail or complete with undesirable consequences. If you need to restore just one database from a VSS Backup that resides on local VSS shadow volumes on DS, SAN Volume Controller, or Storwize V7000 disks, make sure to specify **/instantrestore=no** on the command-line interface. If VSS Instant Restore capability is needed for single databases, make sure to place these databases in their own storage group.

/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. 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 performing a Legacy restore of a mailbox database to a Recovery Storage Group, you must specify */recover=applyrestoredlogs* or the restore operation may fail.

Note: When choosing this option for a restore, your next backup MUST be a full or copy backup.

Considerations

- When restoring multiple backup objects, the */recover* option should be used on the restore of the last object.

Note: If you specify */recover=applyrestoredlogs* when performing a restore, the next backup of the storage group MUST be a full backup.

/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 Data Protection for Exchange configuration file. The default Data Protection for Exchange configuration file is *tdpexc.cfg*.

If you do not specify the */templogrestorepath* parameter, and the TEMPLOGRESTOREPATH value does not exist in the Data Protection for Exchange configuration file, the TEMP environment variable value is used.

Attention:

When performing a **full**, **copy**, or **dbcopy** 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. If the value is the same, the storage group can become corrupted.

Restriction: Do not specify double-byte characters (DBCS) within the temporary log path.

/TSMNODE=tsmnodename

Use the *tsmnodename* variable to refer to the Tivoli Storage Manager node name that Data Protection for Exchange 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 Data Protection for Exchange options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Data Protection for Exchange 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 Data Protection for Exchange uses to log on to the Tivoli Storage Manager server. If you specified PASSWORDACCESS GENERATE in the Data Protection for Exchange 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 Data Protection for Exchange 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 Data Protection for Exchange uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Restore Example 1

This output example provides a sample of the text, messages, and process status that displays when using the **restore** command.

The **tdpexcc restore sg3.sg3 full /recover=applyalllogs** command restores a full type backup of the Exchange Server storage group identified as *sg3.sg3*, and replays the restored-transaction log entries AND the current active-transaction log entries. An example of the output is displayed below.

```
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...

Logging on to the Tivoli Storage Manager server, please wait...

Beginning full restore of storage group sg3.sg3 <06/16/2008 11:14:12>,
1 of 1, to sg3.sg3
Full: 1   Read: 26314796   Written: 26314796   Rate: 3,589.11 Kb/Sec
Restore of sg3.sg3 completed successfully.

Total backups inspected:           1
Total backups requested for restore: 1
Total backups restored:           1

Throughput rate:                   1,054.11 Kb/Sec
Total bytes transferred:           26,314,796
LanFree bytes transferred:         0
Elapsed processing time:           24.38 Secs
```


Restore Example 2

This output example provides a sample of the text, messages, and process status that displays when using the **restore** command.

The **tdpexcc restore sg3.sg3 dbcopy "A Public Store" /recover=applyalllogs** command restores a database copy backup of Exchange Server database *A Public Store*, located in storage group *sg3.sg3*, and replays the restored-transaction log entries AND the current active-transaction log entries. An example of the output is displayed below.

```
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...

Logging on to the Tivoli Storage Manager server, please wait...

Beginning dbcopy restore of storage group sg3.sg3 <07/10/2008 10:25:26>,
1 of 1, to sg3.sg3
Full: 1   Read: 10511010   Written: 10511010   Rate: 4,015.91 Kb/Sec
Restore of sg3.sg3 completed successfully.

Total backups inspected:           1
Total backups requested for restore: 1
Total backups restored:           1

Throughput rate:                   1,024.52 Kb/Sec
Total bytes transferred:           10,511,010
LanFree bytes transferred:         0
Elapsed processing time:            10.02 Secs
```

Restore Example 3

This output example provides a sample of the text, messages, and process status that displays when using the **restore** command.

The **tdpexcc restore stg2 full /backupdestination=tsm /backupmethod=vss** command restores a full VSS Backup of storage group *stg2* from Tivoli Storage Manager server storage to local shadow volumes. An example of the output is displayed below.

```
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.

Connecting to TSM Server as node 'SVC_TDP'...

Connecting to Local DSM Agent 'svc_ba'...

Preparing for restore of 'stg2' from TSM backup.

Files Examined/Completed/Failed: [ 14 / 14 / 0 ]   Total Bytes: 88135694

VSS Restore operation completed with rc = 0
Files Examined   : 14
Files Completed  : 14
Files Failed     : 0
Total Bytes      : 88135694
Total LanFree Bytes : 0
```


Restore Example 4

This output example provides a sample of the text, messages, and process status that displays when using the **restore** command.

The **tdpexcc restore stg4 full /backupdestination=local /backupmethod=vss** command restores a full VSS Backup of storage group *stg4* from local shadow volumes. An example of the output is displayed below.

```
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.

Connecting to TSM Server as node 'TDP_REAL'...
Connecting to Local DSM Agent 'ba_real'...
Starting Microsoft Exchange restore...

Restoring 'stg4' using file-level copy from a snapshot volume.

VSS Restore operation completed with rc = 0
Files Examined   : 7
Files Completed  : 7
Files Failed     : 0
Total Bytes      : 0
Total LanFree Bytes : 0
```

Restore Example 5

This output example provides a sample of the text, messages, and process status that displays when using the **restore** command.

The **tdpexcc restore JGROUP full /backupdestination=local /backupmethod=vss** command restores a full VSS Backup of storage group JGROUP from SAN-attached shadow volumes. An example of the output is displayed below.

```
tdpexcc restore JGROUP full /backupdestination=local /backupmethod=vss

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 'JGROUP'...

Restoring 'JGROUP' using volume-level-copy snapshot.

Starting snapshot restore process. This process may take several minutes.

Total number of volumes failed: 0

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

Restorefiles command

Use the **restorefiles** command to restore the flat files from a specified Data Protection for Exchange backup, into a specified directory. Use this command for both legacy and VSS backups.

The following information provides details about this command for legacy backups:

- This command applies to legacy backups.
- This command does not require an Exchange Server to be installed on, or accessible from the machine where the **restorefiles** command 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 for legacy backups if a previous restored files exist, this is not the case for VSS backup operation.
- The command continues until it succeeds, or until the destination volume does not contain enough space for the operation. This also applies to VSS backups.
- 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. This also applies to VSS backups.
- This command is only available on the command-line interface. It is not available in the Data Protection for Exchange GUI.

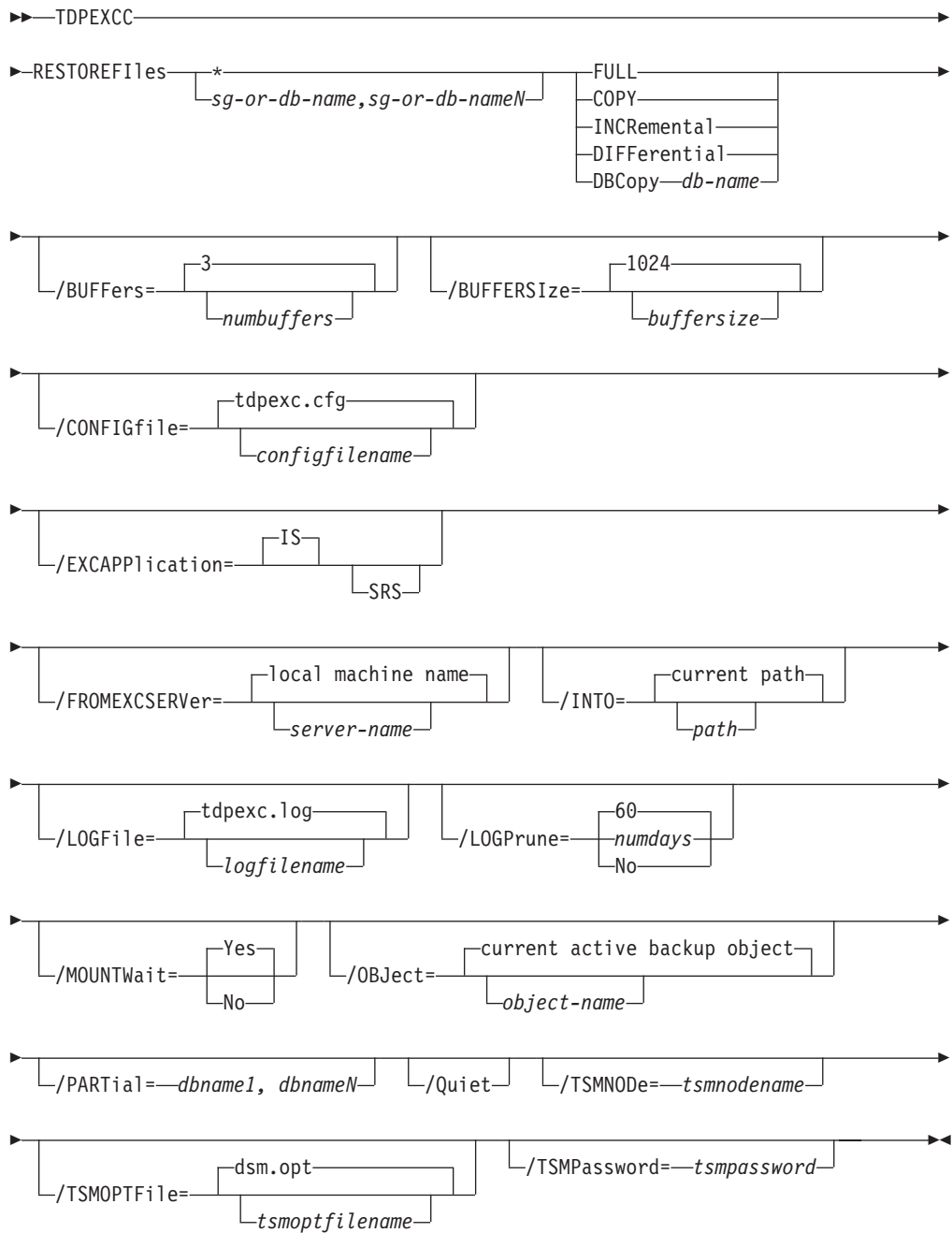
The following provides details about the **restorefiles** command for VSS backups:

- This command applies to VSS backups.
- The **restorefiles** command will restore files from a VSS backup, **/BACKUPMETHOD=VSS**.
- Attention: The VSS **restorefiles** operation will overwrite files that exist and have the same name.
- If a logfile from an incremental backup has the same name as the logfile from the full backup operation, you can run two consecutive **restorefiles** operations to the same directory:

```
tdpexcc restorefiles STG1 FULL /backupmethod=vss /into=d:\temprestore to  
get a full backup  
tdpexcc restorefiles STG1 INCR /backupmethod=vss /into=d:\temprestore to  
get the logs backed up during the incremental restore.
```
- 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 on which the snapshot was created. When using the command in a clustered environment, see Clustered Server Environments for details “Using VSS operations in a Single Copy Cluster environment” on page 36.

Restorefiles syntax

Use the **restorefiles** 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 | DBCopy *dbname*

FULL Restore the files from a Full type backup for legacy and VSS.

COPY Restore the files from a Copy type backup for legacy and VSS.

INCRemental

Restore the files from an Incremental type backup for legacy and VSS.

DIFFerential

Restore the files from a Differential type backup for legacy and VSS.

DBCopy *dbname*

Where **backuptype=legacy** it restores the files from the *dbname* database copy backup.

Restorefiles optional parameters

Optional parameters follow the **restorefiles** command and positional parameters.

/BACKUPMETHOD

Use the **/BACKUPMETHOD=** to specify a restore for either a VSS or legacy backup.

If you enter the command **/BACKUPMETHOD=LEGACY** a backup is performed with the legacy API. Use this command to run legacy backups for collecting data from the Exchange Server, and backing up the data to the TSM Server. Legacy backups can only be backed up to the TSM server **/BACKUPDESTINATION=TSM**.

If you enter the command **/BACKUPMETHOD=VSS** the restore is performed with VSS. If the backup destination is **TSM** then the TSM Remote Agent backs up the files to the TSM server. VSS backups have a backup destination of **TSM** or **LOCAL**.

/BACKUPDESTINATION

VSS backups can have a backup destination of **TSM** or **LOCAL**. Legacy backups can only be backed up to the TSM server

/BACKUPDESTINATION=TSM, TSM is the default.

/BUFFers=numbuffers

Use the **/buffers** parameter when restoring Legacy backups, to specify the number of data buffers that are used for retrieving data from the Tivoli Storage Manager API.

The *numbuffers* variable refers to the number of data buffers to use. The number of data buffers can be from 2 to 8. The default number of data buffers is 3.

/BUFFERSize=buffer size

Use the **/buffer size** parameter for Legacy backups, to specify the size of data buffers that are used to retrieve data from the Tivoli Storage Manager API.

The *buffer size* variable refers to the size of the data buffers in kilobytes. The size of the data buffers can be from 64 to 8192 kilobytes and must be a multiple of 8. For example, you can specify 312 (a multiple of 8) but you cannot specify 313. The default size of the data buffers is **1024** kilobytes.

/CONFIGfile=configfilename

Use the **/configfile** parameter to specify the name of the Data Protection for Exchange configuration file that contains the values for the Data Protection for Exchange configuration options. See "Set command" on page 213 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 Data Protection 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=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 name.

/INTO=pathname

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. For example, if Data Protection for Exchange is installed in the *c:\Program Files\Tivoli\TSM\TDPEExchange* directory and the following command is issued from the *E:\Somedir*: **e:\Somedir> c:\Program Files\Tivoli\TSM\TDPEExchange\tdpexc restorefiles ThirdSG full**, then the files are restored to the subdirectories in the *e:\Somedir* location:

```
e:\Somedir\ThirdSG\DB3_1.edb  
e:\Somedir\ThirdSG\E0200801.log
```

/LOGFile=logfilename

Use the **/logfile** parameter to specify the name of the activity log file that is generated by Data Protection 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 Data Protection 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 Data Protection 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 Data Protection 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 Data Protection 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.

/MOUNTWait=Yes | No

Use the **/mountwait** parameter to specify whether Data Protection for Exchange should wait for removable media to mount (such as tapes or CDs) or to stop the current operation. This situation occurs when the Tivoli Storage Manager server is configured to store backup data on removable media and waits for a required storage volume to be mounted.

You can specify:

- 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 Data Protection for Exchange.

Use the Data Protection 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

- 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.

/TSMNODE=tsmnodename

Use the *tsmnodename* variable to refer to the Tivoli Storage Manager node name that Data Protection for Exchange 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 Data Protection for Exchange options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Data Protection for Exchange 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 Data Protection for Exchange uses to log on to the Tivoli Storage Manager server. If you specified **PASSWORDACCESS GENERATE** in the Data Protection for Exchange 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 Data Protection for Exchange 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 Data Protection for Exchange uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Restorefiles Example 1

This output example provides a sample of the text, messages, and process status that displays when using the **restorefiles** command.

This command, **tdpexcc restorefiles Finance COPY /INTO=e:\test /FROMEXCSERVER=excsrv12 /TSMNODE=excsrv12 /TSMPASSWORD=password**, restores backup files from a COPY type backup of the *Finance* storage group (from the Exchange Server named *excsrv12*) into the *e:\test* directory. The restored files are:

```
e:\test\Finance\E0000011.log
e:\test\Finance\E0000012.log
e:\test\Finance\MB1.edb
e:\test\Finance\MB2.edb
e:\test\Finance\MB3.edb
```

This command, **tdpexcc restorefiles "Litigation Group West" FULL /backupmethod=legacy /backupdestination=tsm /INTO=d:\temp**, restores legacy backup files from a FULL backup of the *Litigation Group West* storage group into the *d:\temp* directory on the TSM Server.

```
d:\temp\Litigation Group West\abrana.edb
d:\temp\Litigation Group West\gbrana.edb
d:\temp\Litigation Group West\E0300000052.log
d:\temp\Litigation Group West\E0300000053.log
d:\temp\Litigation Group West\E0300000054.log
d:\temp\Litigation Group West\E0300000055.log
d:\temp\Litigation Group West\E0300000056.log
d:\temp\Litigation Group West\E0300000057.log
d:\temp\Litigation Group West\E0300000058.log
d:\temp\Litigation Group West\E0300000059.log
d:\temp\Litigation Group West\E030000005A.log
d:\temp\Litigation Group West\E030000005B.log
d:\temp\Litigation Group West\E030000005C.log
d:\temp\Litigation Group West\E030000005D.log
d:\temp\Litigation Group West\E030000005E.log
```

This command, **tdpexcc restorefiles "Litigation Group East" FULL /backupmethod=vss /backupdestination=local /INTO=d:\temp**, restores VSS files from a FULL backup of the *Litigation Group East* storage group into the *d:\temp* directory on the local Server.

```
d:\temp\Litigation Group East\abrana.edb
d:\temp\Litigation Group East\gbrana.edb
d:\temp\Litigation Group East\E03.chk
d:\temp\Litigation Group East\E0300000056.log
d:\temp\Litigation Group East\E0300000057.log
d:\temp\Litigation Group East\E0300000058.log
d:\temp\Litigation Group East\E0300000059.log
d:\temp\Litigation Group East\E030000005A.log
d:\temp\Litigation Group East\E030000005B.log
d:\temp\Litigation Group East\E030000005C.log
d:\temp\Litigation Group East\E030000005D.log
d:\temp\Litigation Group East\E03tmp.log
```

This command, **tdpexcc restorefiles "Transactions Group East" COPY /backupmethod=vss /backupdestination=local /into=d:\temp**, copies restored VSS backup files from a COPY backup of the *Transactions Group East* storage group into the *d:\temp* directory on a local directory.

```
d:\temp\Transactions Group East\attys01.edb
d:\temp\Transactions Group East\E02.chk
d:\temp\Transactions Group East\E0200001.log
```

This command, **tdpexcc restorefiles "Litigation Group North" INCR /backupmethod=vss /backupdestination=local /INTO=d:\tempincr**, restores VSS files from an INCREMENTAL backup of the *Litigation Group North* storage group into the *d:\tempincr* directory on the local Server.

```
d:\tempfull\STG1\E03.chk
d:\tempincr\Litigation Group North\E0300000056.log
d:\tempincr\Litigation Group North\E0300000057.log
d:\tempincr\Litigation Group North\E0300000058.log
d:\tempincr\Litigation Group North\E0300000059.log
d:\tempincr\Litigation Group North\E030000005A.log
d:\tempincr\Litigation Group North\E030000005B.log
d:\tempincr\Litigation Group North\E030000005C.log
d:\tempincr\Litigation Group North\E030000005D.log
d:\tempincr\Litigation Group North\E030000005E.log
d:\tempincr\Litigation Group North\E030000005F.log
d:\tempincr\Litigation Group North\E03tmp.log
```

Restorefiles Example 2

This output example provides a sample of the text, messages, and process status that displays when using the **restorefiles** command.

This command, **tdpexcc restorefiles FSG FULL /PARTIAL=Mailbox2 /INTO=e:\test /FROMEXCSERVER=excsrv05 /TSMNODE=excsrv05 /TSMPASSWORD=password**, restores *Mailbox2* backup files from a FULL type backup of the *FSG* storage group (from the Exchange Server named *excsrv05*) into the *e:\test* directory. The restored files are:

```
e:\test\FSG\E0000029.log
e:\test\FSG\E000002A.log
e:\test\FSG\Mailbox2.edb
```

Restorefiles Example 3

This output example provides a sample of the text, messages, and process status that displays when using the **restorefiles** command.

First, this command, **tdpexcc q tsm * /all /FROMEXCSEVER=EXCH1**, queries the Tivoli Storage Manager server for all active and inactive backups that were originally backed up from the Exchange Server named *EXCH1*. The command displays the following backup objects:

```
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.

Querying Tivoli Storage Manager server for a list of database
backups, please wait...

                                Backup List
                                -----

Exchange Server   : EXCH1

Storage Group     : Second Storage Group

  Backup Date      Size      S Fmt  Type  Loc Object Name/Database Name
  -----
06/14/2008 14:01:19 2,940.06MB A Lgcy full Srv 20080614140119
                               mailbox_jie
                               Second Mail Store
                               Second Public Store
                               Logs
06/14/2008 14:24:59 2,950.05MB A VSS full Loc 20080614142459
                               Logs
                               Second Public Store
                               Second Mail Store
                               mailbox_jie
```

Second, this command, **tdpexcc restorefiles "Second Storage Group" FULL /OBJECT=20080614140119 /INTO=c:\test /FROMEXCSEVER=EXCH1 /TSMNODE=tdp_geo /TSMPASSWORD=password**, restores backup files of *06/14/2008 14:01:19* FULL type backup of the storage group named *Second Storage Group* (from the Exchange Server named *EXCH1*) into the *c:\test* directory. The command displays the following output:

```
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...
Logging on to the Tivoli Storage Manager server, please wait...

Beginning full restore of storage group Second Storage Group <06/14/2008 14:01:19>,
1 of 1, to Second Storage Group
Full: 2   Read: 2327880532   Written: 2325783380   Rate: 2,475.62 Kb/Sec
Waiting for TSM server...
Full: 0   Read: 3082876092   Written: 3082876092   Rate: 2,475.36 Kb/Sec
Restore of Second Storage Group completed successfully.

Total backups inspected:          1
Total backups requested for restore: 1
Total backups restored:          1
Total LanFree bytes:             0

Throughput rate:                  2,475.36 Kb/Sec
Total bytes transferred:          3,082,876,092
Elapsed processing time:          1,216.24 Secs
```

Restoremailbox command

Use the **restoremailbox** command to restore mailbox-level data or mailbox-item-level data from Data Protection for Exchange backups.

The following information provides details about this command:

- Before you start ensure that you have the required privileges to perform Mailbox restores.
 - For Exchange Server 2007 or Exchange Server 2010 and later, the **restoremailbox** command applies to any Data Protection for Exchange Legacy backups (Exchange Server 2007) and VSS Backups (Exchange Server 2007 and Exchange Server 2010), which includes:
 - Legacy backups stored on Tivoli Storage Manager server
 - VSS Backups stored on Tivoli Storage Manager server
 - VSS Backups stored on local shadow volumes
 - You can use 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:
 - The */mailboxoriglocation* parameter is available when you select **Show Restore Options** from the Recover tab. Use this setting to specify the server, the storage group, and the database where the mailbox was located at the time of backup.
 - Alternatively use the command-line interface from the Automate tab to specify the */mailboxoriglocation*.
For example, you must use the */mailboxoriglocation* parameter when restoring a mailbox from a backup taken with a version of Data Protection for Exchange prior to version 6.3, and the mailbox has been relocated since the time of backup.
 - Set the */tempmailboxalias* optional parameter by selecting **Properties** from the Actions pane. In the **Data Protection Properties** dialog, click on the **General** tab to specify the alias of the temporary mailbox. Use this for 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 Data Protection 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 Data Protection for Exchange mailbox restore tasks on Exchange Server 2007

Review these prerequisites before you perform mailbox restore tasks on Exchange Server 2007:

- See “Security requirements for Data Protection for Exchange mailbox restore tasks on Exchange Server 2007” on page 32
- See “4. Perform these tasks to configure your system for mailbox-level and item-level restore operations” on page 71
- 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 on the MMC GUI, or in the Data Protection for Exchange 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.

- Verify that Microsoft Exchange Server MAPI Client and Collaboration Data Objects 1.2.1 version 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.

Prerequisites for Data Protection for Exchange mailbox restore tasks on Exchange Server 2010

Review these prerequisites before you perform mailbox restore tasks on Exchange Server 2010:

- See “Security requirements for Data Protection for Exchange mailbox restore tasks on Exchange Server 2010” on page 32
- See “4. Perform these tasks to configure your system for mailbox-level and item-level restore operations” on page 71
- 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 Data Protection for Exchange 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.

- Verify that Microsoft Exchange Server MAPI Client and Collaboration Data Objects 1.2.1 version 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.

Related tasks

“Restoring individual mailbox and mailbox item-level data” on page 98

“Restoring individual mailbox and mailbox item-level data” on page 98

“Restoring a deleted mailbox or items from a deleted mailbox” on page 100

Related reference

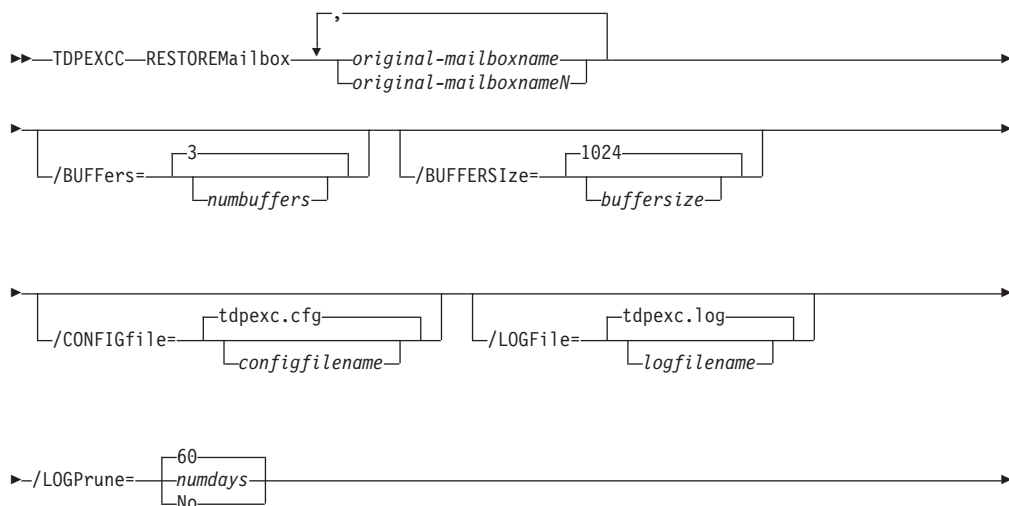
Using the restoremailbox syntax diagram

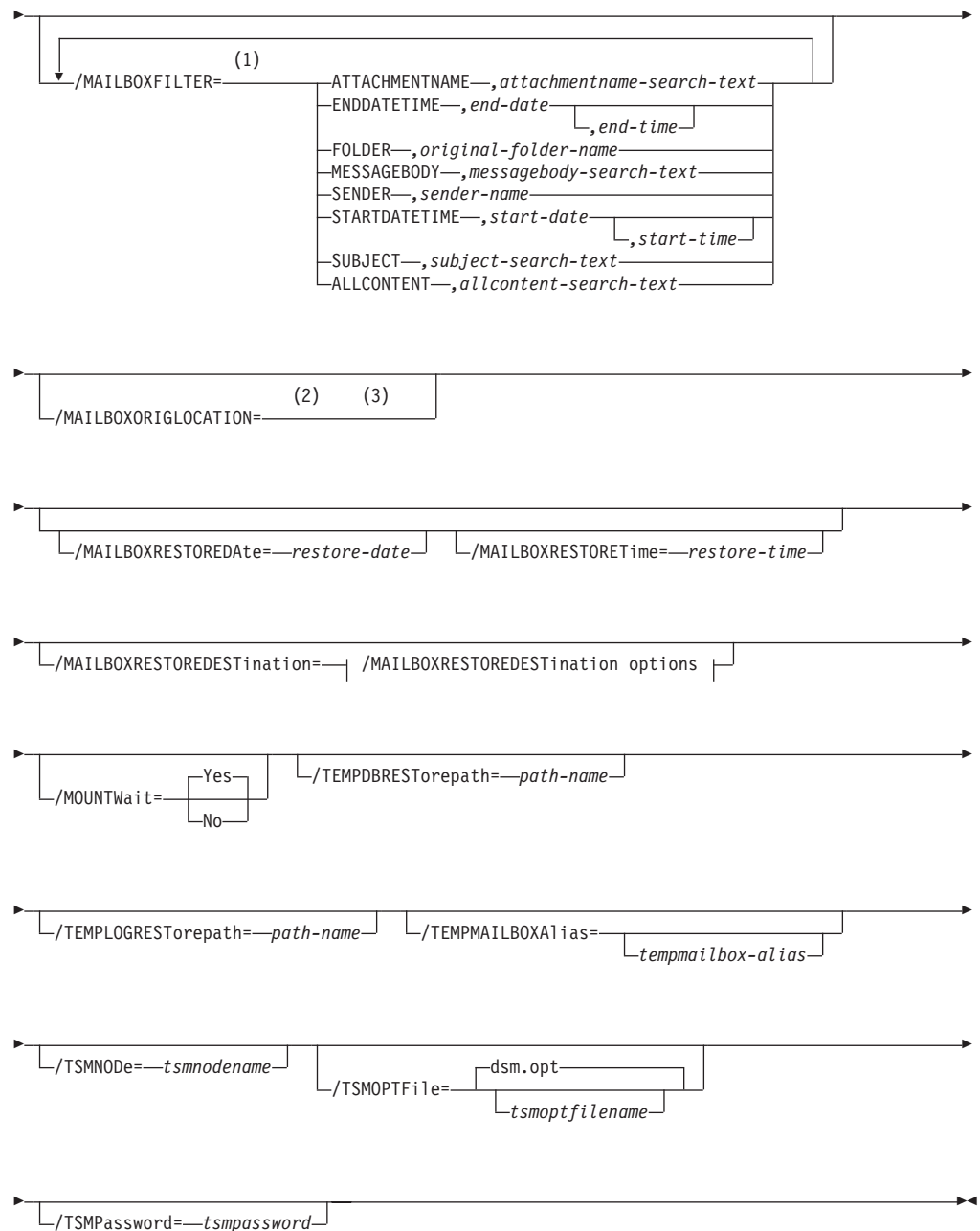
Specifying restoremailbox positional command-line parameters

Specifying the /mailboxfilter parameter, the /mailboxoriglocation parameter, and other restoremailbox optional command-line parameters

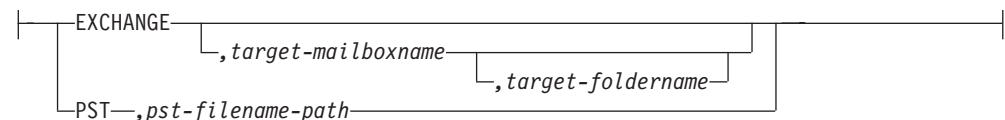
Restoremailbox syntax

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.
- 2 Exchange Server 2007: server-name,sg-name,db-name

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.

/BUFFers=*numbuffers*

Use the **/buffers** parameter to specify the number of data buffers that are used for retrieving data from the Tivoli Storage Manager API.

The *numbuffers* variable refers to the number of data buffers to use. The number of data buffers can be from 2 to 8. The default number of data buffers is 3.

Note: The **/buffers** parameter only affects the operation when a mailbox is being restored from a Legacy Backup.

/BUFFERSize=*buffersize*

Use the **/buffersize** parameter to specify the size of data buffers that are used to retrieve data from the Tivoli Storage Manager API.

The *buffersize* variable refers to the size of the data buffers in kilobytes. The size of the data buffers can be from 64 to 8192 kilobytes and must be a multiple of 8. For example, you can specify 312 (a multiple of 8) but you cannot specify 313. The default size of the data buffers is 1024 kilobytes.

Note: The **/buffersize** parameter only affects the operation when a mailbox is being restored from a Legacy Backup.

/CONFIGfile=*configfilename*

Use the **/configfile** parameter to specify the name of the Data Protection for Exchange configuration file that contains the values for the Data Protection for Exchange configuration options. See "Set command" on page 213 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 Data Protection 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"
```

/LOGFile=logfilename

Use the **/logfile** parameter to specify the name of the activity log file that is generated by Data Protection 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 Data Protection 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 Data Protection 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 Data Protection 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 Data Protection 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 Data Protection for Exchange 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 Data Protection for Exchange 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 Data Protection for Exchange 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 Data Protection for Exchange 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, message subject line, message body, or message attachment. The match is not case-sensitive. For example, an *allcontent-search-text* of **Rob** matches **Rob**, **robert**, **PROBE**, and **prObe** contained within the 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,db-name (Exchange Server 2007) *server-name,db-name (Exchange Server 2010)*

Use the `/mailboxoriglocation` parameter to specify the Exchange Server, the storage group, and the database 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 Exchange Server 2007 storage group where the mailbox resided at the time of backup.

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. This parameter is case sensitive. Data Protection for Exchange 6.1 (and later) maintains mailbox location history.

Attention: A restoremailbox operation from a backup taken with Data Protection 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, 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,mdbb1
/MAILBOXRESTOREDate=02/21/2010
/MAILBOXRESTOREDESTINATION=PST,c:\team99\rcvr.pst
TDPEXCC RESTOREMAILBOX johngrimshawe /MAILBOXORIGLOCATION=serv1,mdbb1
/MAILBOXRESTOREDate=03/06/2010
/MAILBOXRESTOREDESTINATION=PST,c:\team54\rcvr.pst
```

The deleted mailbox needs to be recreated.

/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 Data Protection 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 Data Protection 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.

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 target mailbox can be the original mailbox or an alternate mailbox.

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_acctmng" in the target mailbox "mary brown":

```
restoremailbox "andrew baker","sally wood"  
/mailboxrestoredest=exchange,"mary brown",previous_acctmng
```

The restored mailbox messages are placed in folders copied from the original mailboxes using the following folder structure:

```
mary brown (target mailbox)  
  >-previous_acctmng (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 Accts (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 Data Protection 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 Olaf (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\"
```

/MOUNTWait=Yes|No

Use the **/mountwait** parameter to specify whether Data Protection for Exchange should wait for removable media to mount (such as tapes or CDs) or to stop the current operation. This situation occurs when the Tivoli Storage Manager server is configured to store backup data on removable media and waits for a required storage volume to be mounted.

You can specify:

Yes Wait for tape mounts. This is the default.

No Do not wait for tape mounts.

/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 Data Protection for Exchange configuration file. The default Data Protection for Exchange configuration file is *tdpexc.cfg*. If the

TEMPDBRESTOREPATH value does not exist in the Data Protection 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:

```
TDPEXC 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.

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 Data Protection for Exchange configuration file. The default Data Protection for Exchange configuration file is *tdpexc.cfg*. If you do not specify the **/templogrestorepath** parameter and the TEMPLOGRESTOREPATH value does not exist in the Data Protection 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 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 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.

The **/tempmailboxalias** parameter is valid for Exchange 2007 environments only.

If you do not specify the **/tempmailboxalias** parameter, the default value is the value that is specified by the TEMPMAILBOXALIAS option in the Data Protection for Exchange configuration file. The default Data Protection for Exchange configuration file is *tdpexc.cfg*. If the TEMPMAILBOXALIAS value does not exist in the Data Protection 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.

/TSMNODE=*tsmnodename*

Use the *tsmnodename* variable to refer to the Tivoli Storage Manager node name that Data Protection for Exchange 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 Data Protection for Exchange options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Data Protection for Exchange 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 Data Protection for Exchange uses to log on to the Tivoli Storage Manager server. If you specified PASSWORDACCESS GENERATE in the Data Protection for Exchange 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 Data Protection for Exchange 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 Data Protection for Exchange uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Restoremailbox Example 1

This output example provides a sample of the output that is displayed when using the **restoremailbox** command with no optional parameters.

This restoremailbox command restores the latest copy of an entire user mailbox back to its original location:

```
tdpexcc restoremailbox "ann greene"
```

The following example shows the text, messages, and process status that is displayed when using this **restoremailbox** command:

```

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...

Querying Exchange storage group and database information...
Querying mailbox information...
Preparing Exchange Recovery Storage Group...
Performing mailbox restore using closest available backup.
Starting Microsoft Exchange restore...

Connecting to TSM Server as node 'NODE1_TDP'...
Logging on to the Tivoli Storage Manager server, please wait...

Beginning full restore of storage group stg4 <07/29/2010 15:15:55>, 1 of 1,
to stg4
Full: 0   Read: 15753784   Written: 15753784   Rate: 10,114.76 Kb/Sec

Recovery being run. Please wait. This may take a while...

Restore of stg4 completed successfully.

Total backups inspected:           1
Total backups requested for restore: 1
Total backups restored:           1
Total LanFree bytes:              0

Throughput rate:                   10,094.85 Kb/Sec
Total bytes transferred:           15,753,784
Elapsed processing time:           1.52 Secs

Querying Exchange Recovery Storage Group...

Checking Active Directory entries...
Restoring mailbox 'ann greene (agreene)' to original location...
Mailbox restore completed successfully with 1 items restored.

Removing Exchange Recovery Storage Group...

Total mailboxes requested for restore: 1
Total mailboxes restored:           1

```

Restoremailbox Example 2

This output example provides a sample of the output that is displayed when using the **restoremailbox** command to restore a subset of items from a user mailbox from an earlier point in time into a folder in an alternate user mailbox.

This command restores only the items that were originally under the folder named "Inbox":

```

tdpexcc restoremailbox "ann greene" /mailboxrestoredate=07/29/2008
/mailboxrestoretime=20:03:40
/mailboxrestoredestination=exchange,"bill jones","tempfolder"
/mailboxfilter=folder,"Inbox"

```

The following example shows the text, messages, and process status that is displayed when using this restoremailbox command:

```

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...

Querying Exchange storage group and database information...
Querying mailbox information...
Preparing Exchange Recovery Storage Group...
Starting Microsoft Exchange restore...

Connecting to TSM Server as node 'NODE1_TDP'...
Logging on to the Tivoli Storage Manager server, please wait...

Beginning full restore of storage group stg4 <07/29/2008 20:03:40>, 1 of 1,
to stg4
Full: 0   Read: 26240104   Written: 26240104   Rate: 5,591.34 Kb/Sec

Recovery being run. Please wait. This may take a while...

Restore of stg4 completed successfully.

Total backups inspected:          1
Total backups requested for restore: 1
Total backups restored:          1
Total LanFree bytes:             0

Throughput rate:                  5,586.46 Kb/Sec
Total bytes transferred:          26,240,104
Elapsed processing time:          4.59 Secs

Querying Exchange Recovery Storage Group...

Checking Active Directory entries...
Restoring mailbox 'ann greene (agreene)' to 'bill jones (bjones)'...
Mailbox restore completed successfully with 2 items restored.

Removing Exchange Recovery Storage Group...

Total mailboxes requested for restore: 1
Total mailboxes restored:           1

```

Restoremailbox Example 3

This output example provides a sample of the output that is displayed when using the **restoremailbox** command to restore a subset of items from a user's mailbox from an earlier point in time into the .pst file *c:\reports_bill.pst*.

This command restores only the items that contain the text "reports" in the subject line:

```

tdpexcc restoremailbox bjones /mailboxrestoredate=07/29/2007
/mailboxrestoredestination=pst,c:\reports_bill.pst /mailboxfilter=subject,"reports"

```

The following example shows the text, messages, and process status that is displayed when using this restoremailbox command:


```

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.

ACN5057I The C:\Program Files\Tivoli\TSM\TDPEXchange\tdpexc.log log file has been
pruned successfully.

Starting Microsoft Exchange restore...

Querying Exchange storage group and database information...
Querying mailbox information...
Preparing Exchange Recovery Storage Group...
Performing mailbox restore using closest available backup.
Starting Microsoft Exchange restore...

Connecting to TSM Server as node 'NODE1_TDP'...
Logging on to the Tivoli Storage Manager server, please wait...

Beginning full restore of storage group stg4 <07/29/2008 20:03:40>, 1 of 1,
to stg4
Full: 0 Read: 26240104 Written: 26240104 Rate: 10,188.91 Kb/Sec

Recovery being run. Please wait. This may take a while...

Restore of stg4 completed successfully.

Total backups inspected:          1
Total backups requested for restore: 1
Total backups restored:          1
Total LanFree bytes:             0

Throughput rate:                  10,176.77 Kb/Sec
Total bytes transferred:          26,240,104
Elapsed processing time:          2.52 Secs

Querying Exchange Recovery Storage Group...

Checking Active Directory entries...
Restoring mailbox 'bill jones (bjones)' to 'c:\reports_bill.pst'...
Mailbox restore completed successfully with 3 items restored.

Removing Exchange Recovery Storage Group...

Total mailboxes requested for restore: 1
Total mailboxes restored:          1

```

Restoremailbox Example 4

This output example provides a sample of the output that is displayed when using the **restoremailbox** command to restore multiple user's entire mailboxes from an earlier point in time back to each mailboxes original location.

The following command restores the multiple users on a single restore request. All of the mailboxes reside in the same storage group:

```
tdpexcc restoremailbox agreene,bjones,mbailey
/mailboxrestoretime=16:17:58
```

The following example shows the text, messages, and process status that is displayed when using this restoremailbox command:

```

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...

Querying Exchange storage group and database information...
Querying mailbox information...
Preparing Exchange Recovery Storage Group...
Starting Microsoft Exchange restore...

Connecting to TSM Server as node 'NODE1_TDP'...
Logging on to the Tivoli Storage Manager server, please wait...

Beginning full restore of storage group stg4 <07/29/2008 16:17:58>, 1 of 1,
to stg4
Full: 0   Read: 23094208   Written: 23094208   Rate: 10,204.95 Kb/Sec

Recovery being run. Please wait. This may take a while...

Restore of stg4 completed successfully.

Total backups inspected:           1
Total backups requested for restore: 1
Total backups restored:           1
Total LanFree bytes:              0

Throughput rate:                   10,186.51 Kb/Sec
Total bytes transferred:           23,094,208
Elapsed processing time:           2.21 Secs

Querying Exchange Recovery Storage Group...

Checking Active Directory entries...
Restoring mailbox 'ann greene (agreene)' to original location...
Mailbox restore completed successfully with 3 items restored.

Restoring mailbox 'bill jones (bjones)' to original location...
Mailbox restore completed successfully with 2 items restored.

Restoring mailbox 'mary bailey (mbailey)' to original location...
Mailbox restore completed successfully with 2 items restored.

Removing Exchange Recovery Storage Group...

Total mailboxes requested for restore: 3
Total mailboxes restored:             3

```

Related reference

“Restoremailbox command” on page 186

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 or later).

You must have local registry rights (for all versions of Exchange Server) to perform a Data Protection for Exchange delete backup.

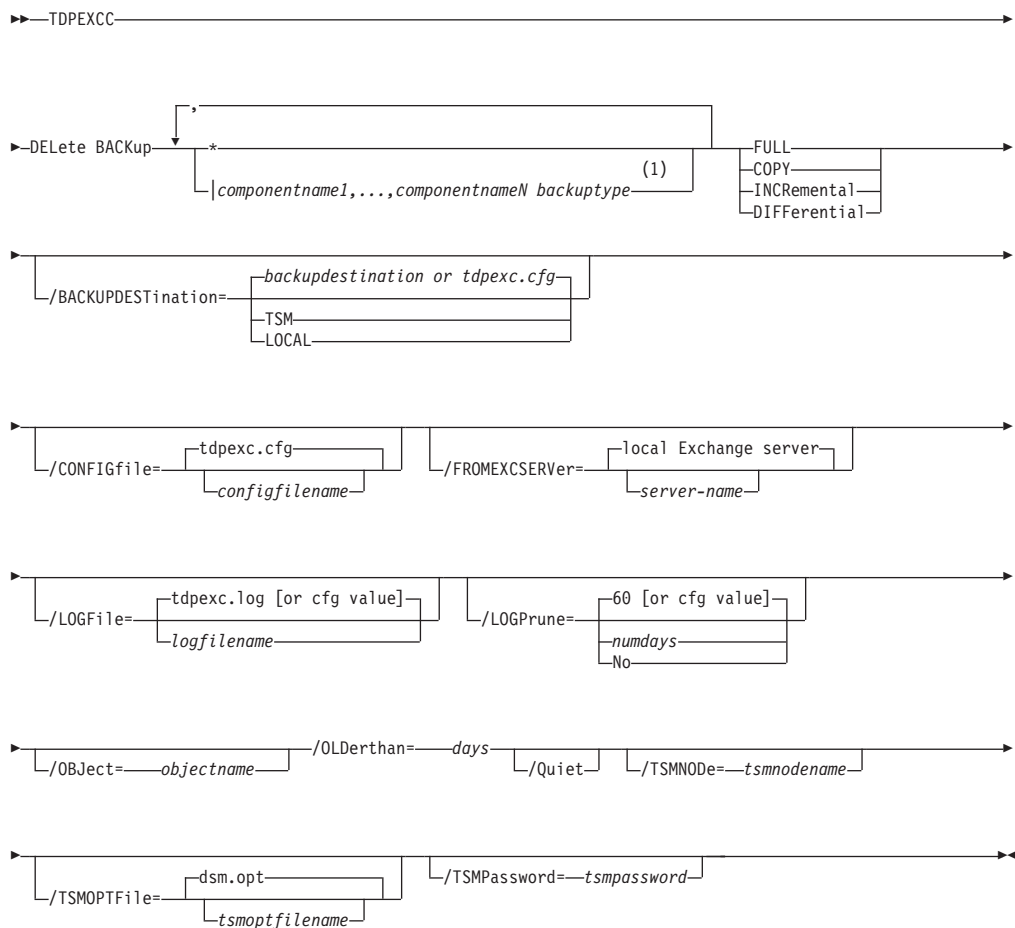
Note:

- 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 VSS 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.

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 for Exchange 2007, or a database name for 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:

*** | *componentname***

***** Delete the active backups of all **componentname** groups.

sg-name* or *db-name

Delete a backup of the specified storage group for Exchange 2007, or database name for Exchange 2010 and 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 storage group name. If any storage group contains commas or blanks, enclose the storage group name in double quotation marks.

Attention:

- Be careful to delete only the desired backups.
- 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=TSM | LOCAL

Use the **/backupdestination** parameter to specify the location from where the backup is to be deleted. The default is the value (if present) specified in the Data Protection for Exchange preferences file (tdpexc.cfg). If no value is present, the backup is deleted from Tivoli Storage Manager server storage.

You can specify:

TSM The backup is deleted from Tivoli Storage Manager server storage. This is the default value.

LOCAL The backup is deleted from the local shadow volumes.

/CONFIGfile=*configfilename*

Use the **/configfile** parameter to specify the name (*configfilename*) of the Data Protection 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 Data Protection 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 214 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 Data Protection 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 Data Protection 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 Data Protection 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 Data Protection 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 Data Protection 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 Data Protection for Exchange.

Use the Data Protection for Exchange **query tsm * /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 before they are 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.

/TSMNode=tsmnodename

Use the *tsmnodename* variable to refer to the Tivoli Storage Manager node name that Data Protection for Exchange 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 Data Protection for Exchange options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Data Protection for Exchange 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 Data Protection for Exchange uses to log on to the Tivoli Storage Manager server. If you specified **PASSWORDACCESS GENERATE**

in the Data Protection for Exchange 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 Data Protection for Exchange 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 Data Protection for Exchange 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 **tdpexcc delete backup "First Storage Group" full** command deletes the full backup of storage group First Storage Group. The following output is displayed:

```
Backup(s) to be deleted:
<First Storage Group : VSS : full : 03/12/2011 10:24:11>
VSS Delete backup operation completed with rc = 0
Files Examined   : 1
Files Completed  : 1
Files Failed     : 0
Total Bytes      : 0
```

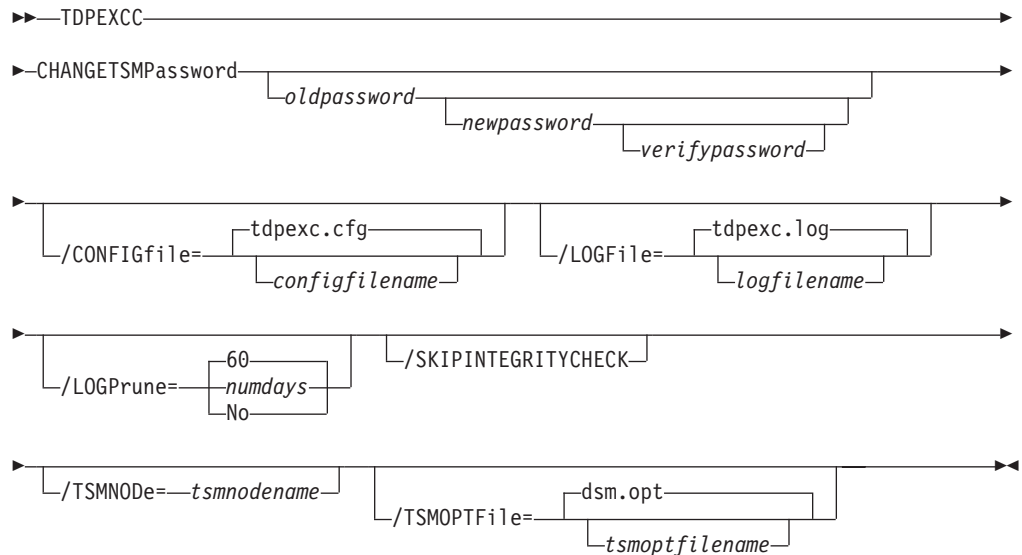
Changetsmpassword command

Use the **changetsmpassword** command to change the Tivoli Storage Manager password used by Data Protection for Exchange to log on to the Tivoli Storage Manager server.

If you do not enter the old and new passwords, Data Protection for Exchange prompts you for the old and new passwords. Data Protection for Exchange does not display the password on the screen. The Tivoli Storage Manager password Data Protection for Exchange uses to log on to the Tivoli Storage Manager server can be up to 63 characters in length.

Changetsmpassword syntax

Use the **changetsmpassword** command syntax diagrams as a reference to view available options and truncation requirements.



Changetsmpassword positional parameters

Positional parameters immediately follow the **changetsmpassword** command and precede the optional parameters.

The following positional parameters specify required password information:

oldpassword newpassword verifypassword

oldpassword

Specifies the current password used by Data Protection for Exchange.

newpassword

Specifies the new password used by Data Protection for Exchange.

verifypassword

Specifies the new password again for verification.

If any of these values are not entered during a command invocation, you are prompted for them.

Changetsmpassword optional parameters

Optional parameters follow the **changetsmpassword** command and positional parameters.

/CONFIGfile=*configfilename*

Use the **/configfile** parameter to specify the name of the Data Protection for Exchange configuration file that contains the values for the Data Protection for Exchange configuration options. See “Set command” on page 213 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 Data Protection 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"
```

/LOGFile=logfilename

Use the **/logfile** parameter to specify the name of the activity log file that is generated by Data Protection 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 Data Protection 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 Data Protection 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.

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 Data Protection 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 Data Protection 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.

/TSMNODE=tsmnodename

Use the *tsmnodename* variable to refer to the Tivoli Storage Manager node name that Data Protection for Exchange 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 Data Protection for Exchange options file.

The file name can include a fully qualified path name. If no path is specified, the directory where Data Protection for Exchange is installed is searched.

If the *tsmoptfilename* variable includes spaces, enclose the entire **/tsmoptfile** parameter entry in quotation marks. For example:

/TSMOPTFile="c:\Program Files\file.opt"

The default is **dsm.opt**.

Changetsmpassword Example

These output example provides a sample of the text, messages, and process status that displays when using the **changetsmpassword** command.

The **tdpexcc changetsmpassword oldpw newpw newpw** command changes the Tivoli Storage Manager password used by Data Protection for Exchange. An example of the output is displayed below.

```
IBM Tivoli Storage Manager for Mail:
Data Protection for Microsoft Exchange Server
Version 6, Release Version 3, Level 0.0
(C) Copyright IBM Corporation 1998, 2011. All rights reserved.

ACN0260I Password successfully changed.
```

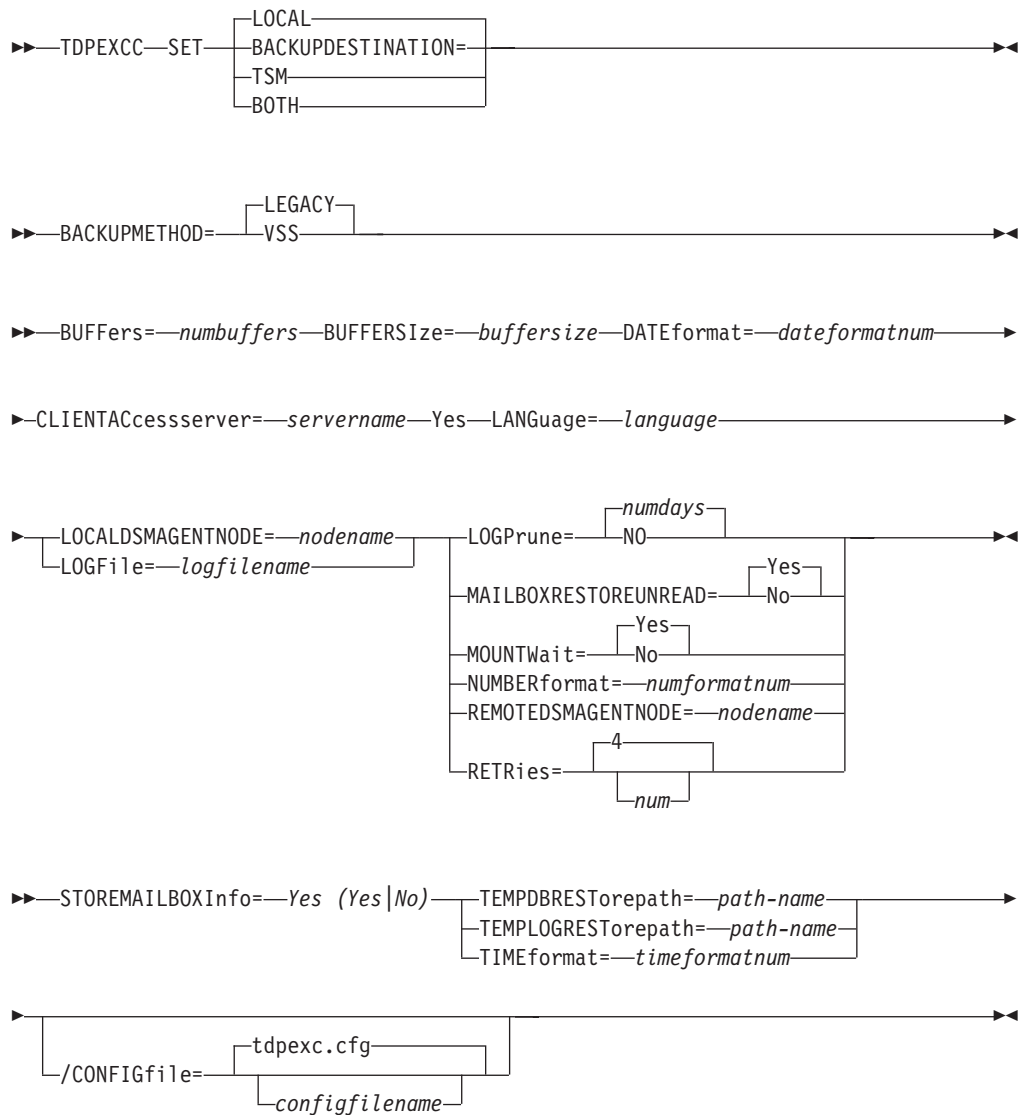
Set command

Use the **set** command to set the Data Protection for Exchange configuration parameters defined in the Data Protection 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 Data Protection 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 Data Protection 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 Data Protection 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 Data Protection for Exchange configuration file. You can set only one value for each **tdpexc set** command run:

BACKUPDESTination=TSM | LOCAL | BOTH

Use the **BACKUPDESTINATION** positional parameter to specify the storage location for your backup. You can specify:

TSM The backup is stored on Tivoli Storage Manager server storage only. This is the default.

LOCAL

The backup is stored on local shadow volumes only.

BOTH The backup is stored on both Tivoli Storage Manager server storage and local shadow volumes.

BACKUPMETHod=Legacy|VSS

Use the BACKUPMETHOD positional parameter to specify the method for your backup. You can specify:

LEGACY

Data Protection for Exchange uses the legacy API to perform the backup. This is the default.

VSS Data Protection for Exchange uses VSS to perform the backup.

BUFFers=numbuffers

Use the BUFFers positional parameter to specify the number of data buffers that are used for moving data between the Exchange Server and the Tivoli Storage Manager API. Increasing the number of data buffers can improve throughput. You can specify a value of 2 through 8 in the *numbuffers* value.

The **buffers** parameter is ignored when Data Protection for Exchange is used with Exchange Server 2010 or later, or with the stand-alone version of Tivoli Storage Manager FlashCopy Manager.

BUFFERSize=buffer size

Use the BUFFERSize positional parameter to specify the size of data buffers that are used to move data between the Exchange Server and the Tivoli Storage Manager API.

The *buffer size* variable refers to the size of the data buffers in kilobytes. The size of the data buffers can be from 64 to 8192 kilobytes and must be a multiple of 8. For example, you can specify 312 (a multiple of 8) but you cannot specify 313. The default size of the data buffers is **1024** kilobytes.

The **buffer size** parameter is ignored when Data Protection for Exchange is used with Exchange Server 2010 or later, or with the stand-alone version of Tivoli Storage Manager FlashCopy Manager.

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 Data Protection 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 Data Protection 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 Data Protection for Exchange. The Data Protection 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 Data Protection 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.

MOUNTWait=Yes | No

Use the MOUNTWait positional parameter to specify whether Data Protection for Exchange should wait for removable media to mount (such

as tapes or CDs) or to stop the current operation. This situation occurs when the Tivoli Storage Manager server is configured to store backup data on removable media and waits for a required storage volume to be mounted.

Specify **Yes** for Data Protection for Exchange to wait until all initial volumes of any required removable media are made available to the Tivoli Storage Manager server before completing the command.

Specify **No** for Data Protection for Exchange to terminate the command (if removable media are required). An error message will display.

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

REMOTEDSMAgentnode=nodename

Specify the node name of the machine that moves the VSS data to Tivoli Storage Manager server storage during offloaded backups.

RETRies=num

Use the **RETRies** positional parameter to specify the number of times that Data Protection for Exchange will retry a failed Legacy Backup. You can specify a value of 0 through 32 in the *num* value. The default value is 4.

The **retries** parameter is ignored when Data Protection for Exchange is used with Exchange Server 2010 or later, or with the stand-alone version of Tivoli Storage Manager FlashCopy Manager.

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.

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 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 Data Protection 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 Data Protection 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 logfile=d:\tsm\tdpexchange\exchange.log** command specifies *exchange.log*, in the *d:\tsm\tdpexchange* directory, as the Data Protection for Exchange log file instead of the default Data Protection for Exchange log file, *tdpexc.log*, located in the directory where Data Protection for Exchange is installed. An example of the output is displayed below.

```
IBM Tivoli Storage Manager for Mail:
Data Protection for Microsoft Exchange Server
Version 6, Release 1, Level 2.0
(C) Copyright IBM Corporation 1998, 2010. All rights reserved.

ACN5054I The preference has been set successfully.
```

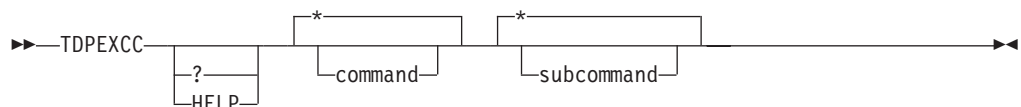
Help command

Use the **help** command to display help for Data Protection 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 Data Protection for Exchange **help** command.

The following optional parameters specify the help to be displayed:

**|command*

Identifies the specific Data Protection for Exchange command that is to be displayed. If the wildcard character (*) is used, help for all Data Protection for Exchange commands is displayed.

The valid command names are shown below:

```
BACKup
CHANGETSMPassword
HELP
Query
RESTore
RESTOREFiles
RESTOREMailbox
SET
```

**|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 Data Protection for Exchange **query** commands is displayed.

The valid subcommand names for the **query** command are shown below:

```
EXCHange
TDP
TSM
```

Help Example 1

This output example provides a sample of the text, messages, and process status that displays when using the Data Protection for Exchange **help** command.

The **tdpexcc help** command displays available help for Data Protection for Exchange. The following output is displayed:

```
Choose from the following commands:

TDPExCC BACKup *|componentname1,...,componentnameN backuptype
  where backuptype can be:
    FULL|COPY|INCRemental|DIFFerential|DBCpy dbname
  [/BACKUPDESTination=TSM|LOCAL|BOTH] (default: TSM)
  [/BACKUPMETHod=LEGACY|VSS] (default: LEGACY)
  [/CONFIGfile=tdpexc.cfg|filename] (default: tdpexc.cfg)
  [/EXCAPPLication=SRS] (default: Information Store)
  [/FROMREPLICA]
  [/LOGFile=tdpexc.log|logfilename] (default: tdpexc.log)
  [/LOGPrune=60|n|No] (default: 60)
  [/MOUNTWait=Yes|No] (default: Yes)
  [/OFFLOAD]
  [/Quiet]
  [/SKIPINTEGRITYCHECK]
  [/TSMNODE=nodename]
  [/TSMOPTFile=dsm.opt|filename] (default: dsm.opt)
  [/TSMPassword=password]
```

```

TDPXCC CHANGETSMPassword [oldpw [newpw [verifypw]]]
[/CONFIGfile=tdpexc.cfg|filename] (default: tdpexc.cfg)
[/LOGFile=tdpexc.log|logfile] (default: tdpexc.log)
[/LOGPrune=60|n|No] (default: 60)
[/TSMNODE=nodename]
[/TSMOPTFile=dsm.opt|filename] (default: dsm.opt)

```

```

TDPXCC [ HELP|? [*|command [*|subcommand]] ]
Valid command names:      Valid subcommands:
  BACKUp                  EXCHange
  CHANGETSMPassword       TDP
  HELP                    TSM
  Query
  RESTore
  RESTOREFiles
  SET

```

```

TDPXCC Query EXCHange
[/CONFIGfile=tdpexc.cfg|filename] (default: tdpexc.cfg)
[/LOGFile=tdpexc.log|logfile] (default: tdpexc.log)
[/LOGPrune=60|n|No] (default: 60)

```

```

TDPXCC Query TDP
[/CONFIGfile=tdpexc.cfg|filename] (default: tdpexc.cfg)
[/LOGFile=tdpexc.log|logfile] (default: tdpexc.log)
[/LOGPrune=60|n|No] (default: 60)

```

```

TDPXCC Query TSM [*|componentname1,...,componentnameN [backuptype]]
  where componentname can be:
    A storage group name (sgname) (Exchange 2007)
    A database name      (dbname) (Exchange 2010 or later)
  where backuptype can be:
    FULL|COPY|INCRemental|DIFFerential|DBCopY dbname
[/Active]
[/All]
[/CONFIGfile=tdpexc.cfg|filename] (default: tdpexc.cfg)
[/DEtail]
[/FROMEXCSErVer=servername] (default: local exchange server)
[/LOGFile=tdpexc.log|logfile] (default: tdpexc.log)
[/LOGPrune=60|n|No] (default: 60)
[/TSMNODE=nodename]
[/TSMOPTFile=dsm.opt|filename] (default: dsm.opt)
[/TSMPassword=password]

```

```

TDPEXCC RESTore *|componentname1,...,componentnameN backuptype
where componentname can be:
    A storage group name (sgname) (Exchange 2007)
    A database name (dbname) (Exchange 2010 or later)
where backuptype can be:
    FULL|COPY|INCRemental|DIFFerential
[/BACKUPDESTination=TSM|LOCAL] (default: TSM)
[/BACKUPMETHod=LEGACY|VSS] (LEGACY for Exchange 2007)
                        (VSS for Exchange 2007 or later)
[/BUFFers=numbuffers] (default: 3)
[/BUFFERSize=buffersize] (default: 1024)
[/CONFIGfile=tdpexc.cfg|filename] (default: tdpexc.cfg)
[/ERASEexistinglogs=Yes|No] (default: No)
[/EXCAPplication=SRS] (only for LEGACY; default: Information Store)
[/FROMEXCSErver=servername] (default: local exchange server)
[/INSTANTRestore=Yes|No] (default: Yes)
[/INTOSG=sg-name] (default: NONE) (Exchange 2007)
[/INTODB=db-name] (default: NONE) (Exchange 2010 or later)
[/LOGFile=tdpexc.log|logfilename] (default: tdpexc.log)
[/LOGPrune=60|n|No] (default: 60)
[/MOUNTDatabases=No|Yes] (default: No)
[/MOUNTWait=Yes|No] (default: Yes)
[/OBJect=object] (default: current active object)
[/PARTial=dbname1,...,dbnameN] (default: NONE)
[/Quiet]
[/RECOVer=APPLYALLlogs|APPLYRESToredlogs]
[/TEMPLOGRESTorepath=pathname] (default: TEMP environment var)
[/TSMNODe=nodename]
[/TSMOPTFile=dsm.opt|filename] (default: dsm.opt)
[/TSMPassword=password]

```

```

TDPEXCC RESTOREFiles *|componentname1,...,componentnameN backuptype
where componentname can be:
    A storage group name (sgname) (Exchange 2007)
    A database name (dbname) (Exchange 2010 or later)
where a LEGACY backuptype can be:
    FULL|COPY|INCRemental|DIFFerential|DBCOPY dbname
where a VSS backuptype can be:
    FULL|COPY|INCRemental|DIFFerential
[/BACKUPDESTination=TSM|LOCAL] (default: TSM)
[/BACKUPMETHod=LEGACY|VSS] (LEGACY for Exchange 2007)
                        (VSS for Exchange 2007 or later)
[/BUFFers=numbuffers] (LEGACY only; default: 3)
[/BUFFERSize=buffersize] (LEGACY only; default: 1024)
[/CONFIGfile=tdpexc.cfg|filename] (default: tdpexc.cfg)
[/EXCAPplication=SRS] (LEGACY only; default: Information Store)
[/FROMEXCSErver=servername] (default: local exchange server)
[/INTO=path] (default: current path)
[/LOGFile=tdpexc.log|logfilename] (default: tdpexc.log)
[/LOGPrune=60|n|No] (default: 60)
[/MOUNTWait=Yes|No] (default: Yes)
[/OBJect=object] (default: current active object)
[/PARTial=dbname1,...,dbnameN] (default: NONE)
[/Quiet]
[/TSMNODe=nodename]
[/TSMOPTFile=dsm.opt|filename] (default: dsm.opt)
[/TSMPassword=password]

```

```

TDPXCC RESTOREMailbox mailbox-name[,mailbox-name2,mailbox-name3,...]
  where mailbox-name can be:
    an alias or display name
  [/BUFFers=numbuffers] (default: 3)
  [/BUFFERSize=buffersize] (default: 1024)
  [/CONFIGfile=tdpexc.cfg|filename] (default: tdpexc.cfg)
  [/LOGFile=tdpexc.log|logfilename] (default: tdpexc.log)
  [/LOGPrune=60|n|No] (default: 60)
  [/MAILBOXfilter=filter-name,filter-criteria[,filter-time-criteria]]
  where filtername can be:
    ATTACHMENTNAME|ENDDATETIME|FOLDER|MESSAGEBODY|
    SENDER|STARTDATETIME|SUBJECT|ALLCONTENT
  [/MAILBOXoriglocation=server-name,sg-name,db-name]
  [/MAILBOXRESTOREdate=date-stamp]
  [/MAILBOXRESTOREDESTination=dest[,dest-parms]]
  where dest can be:
    EXCHANGE|PST
  [/MAILBOXRESTORETime=time-stamp]
  [/MOUNTWait=Yes|No] (default: Yes)
  [/Quiet]
  [/TEMPLOGRESTorepath=pathname] (default: TEMP environment var)
  [/TEMPMAILBOXAlias=alias] (default: mailbox alias of the current user)
  [/TEMPDBRESTorepath=pathname] (default: TEMP environment var)
  [/TSMNODE=nodename]
  [/TSMOPTFile=dsm.opt|filename] (default: dsm.opt)
  [/TSMPassword=password]

```

```

TDPEXCC SET PARMname=value
[/CONFIGfile=tdpexc.cfg|filename] (default: tdpexc.cfg)

where PARMname and default values are:
BACKUPDESTINATION=TSM|LOCAL|BOTH
BACKUPMETHOD=LEGACY|VSS (LEGACY for Exchange 2007)
(VSS for Exchange 2007 or later)
BUFFers=3 (2..8)
BUFFERSize=1024 (64..8192)
CLIENTAccessserver=servername (Exchange 2010 or later only)
DATEformat=
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
LANGuage=3-letter country code
ENU American English
PTB Brazilian Portuguese
CHS Chinese, Simplified
CHT Chinese, Traditional
FRA Standard French
DEU Standard German
ITA Standard Italian
JPN Japanese
KOR Korean
ESP Standard Spanish
LOCALDSMAGENTNODE=nodename
LOGFile=tdpexc.log (filename)
LOGPrune=60 (0..9999) | No
MOUNTWait=Yes (Yes|No)
NUMBERformat=
1 n,nnn.dd
2 n,nnn,dd
3 n nnn,dd
4 n nnn.dd
5 n.nnn,dd
6 n'nnn,dd
REMOTESMAGENTNODE=nodename
RETRIES=n (where n can be from 0 to 32, Default: 4)
STOREMAILBOXInfo=Yes (Yes|No)
TEMPDBRestorepath=path (pathname)
TEMPLOGRestorepath=path (pathname)
TIMEformat=
1 HH:MM:SS
2 HH,MM,SS
3 HH.MM.SS
4 HH:MM:SSA/P

```

EXAMPLES:

```

TDPEXCC Backup "Component 1" full
TDPEXCC Query TSM

Completed

```


Help Example 2

This output example provides a sample of the text, messages, and process status that displays when using the Data Protection for Exchange **help** command.

The **tdpexcc help restore** command displays available help for Data Protection for Exchange query commands. The following output is displayed:

```
TDPEXCC RESTore *|componentname1,...,componentnameN backuptype
where componentname can be:
  A storage group name (sgname) (Exchange 2007)
  A database name (dbname) (Exchange 2010 or later)
where backuptype can be:
  FULL|COPY|INCRemental|DIFFerential
[/BACKUPDESTination=TSM|LOCAL] (default: TSM)
[/BACKUPMETHod=LEGACY|VSS] (LEGACY for Exchange 2007)
                          (VSS for Exchange 2007 or later)
[/BUFFers=numbuffers] (default: 3)
[/BUFFERSize=buffersize] (default: 1024)
[/CONFIGfile=tdpexc.cfg|filename] (default: tdpexc.cfg)
[/ERASEexistinglogs=Yes|No] (default: No)
[/EXCAPplication=SRS] (only for LEGACY; default: Information Store)
[/FROMEXCSErver=servername] (default: local exchange server)
[/INSTANTRestore=Yes|No] (default: Yes)
[/INTOSG=sg-name] (default: NONE) (Exchange 2007)
[/INTODB=db-name] (default: NONE) (Exchange 2010 or later)
[/LOGFile=tdpexc.log|logfilename] (default: tdpexc.log)
[/LOGPrune=60|n|No] (default: 60)
[/MOUNTDatabases=No|Yes] (default: No)
[/MOUNTWait=Yes|No] (default: Yes)
[/OBJect=object] (default: current active object)
[/PARTial=dbname1,...,dbnameN] (default: NONE)
[/Quiet]
[/RECOVer=APPLYALLlogs|APPLYRESToredlogs]
[/TEMPLOGRESTorepath=pathname] (default: TEMP environment var)
[/TSMNODE=nodename]
[/TSMOPTFile=dsm.opt|filename] (default: dsm.opt)
[/TSMPassword=password]

Completed
```

Query Policy command

Use the **query policy** command to query local policy information.

Query Policy

This command is used to list the attributes of a policy.

►►—TDPEXCC—Query 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
-----
EXCPOL      3                             60
STANDARD    2                             30
```

Legacy quick configuration (Exchange Server 2007)

This section provides instructions on how to perform a quick install, configuration, and Legacy back up of a storage group using the Data Protection for Exchange console. This procedure applies to Exchange Server 2007 only.

If you plan to perform VSS operations, you must follow configuration instructions provided in Chapter 4, “Configuring Data Protection for Exchange,” on page 67. It minimizes setup time and allows you to proceed quickly to a state where you can begin backing up your Exchange storage groups. See Chapter 4, “Configuring Data Protection for Exchange,” on page 67 for detailed instructions on how to customize Data Protection for Exchange for your environment and processing needs.

1. Install Data Protection for Exchange from an account that is a member of the local Administrators group for the machine on which the Exchange server is running.
 - Detailed installation instructions are available in “Quick installation and configuration of Data Protection for Exchange” on page 55.
2. In the Program Files\Tivoli\TSM\TDPEXchange directory, edit this dsm.opt file with the following options:
 - **nodename**: Specify the nodename of the machine where Data Protection for Exchange is installed. This is the unique name by which the Tivoli Storage Manager server recognizes your machine.
 - **tcpserveraddress**: Specify the TCP/IP address of the Tivoli Storage Manager server to which you will back up your Exchange databases. You can specify the address as a domain name (server.xyz.company.com) or a dot address (10.100.23.5).
3. Start the Data Protection for Exchange GUI by selecting **Start→Programs→Tivoli Storage Manager→Data Protection for Exchange→Exchange Client Console**.
4. Expand the **Manage** node in the navigation pane, and click **Configuration → Files**. Click on the file to view its details in the command-line interface and edit it accordingly: dsm.opt or tdpexc.cfg.
5. In the navigation pane, expand the **Protect and Recover** node, and click on the Exchange Server. In the **Protect** tab select the storage groups for backup.

Tip: Select multiple storage groups by holding down the **Ctrl** key while selecting.
6. Right click on the selection to view the options for backup. Choose a backup method, destination and type to start the backup.
7. Enter the Tivoli Storage Manager password provided by your Tivoli Storage Manager administrator. A **Backup Progress** panel displays that shows the progress of your backup.
8. The results and progress of the task are displayed in the Task List.
9. Exit the Console by selecting **File→Exit** in the Menu bar.

At this point, Data Protection for Exchange is installed, configured, and has performed the initial full backup of the selected storage group(s). Review the rest of this publication to become familiar with Data Protection for Exchange features, policies, procedures, and backup strategies, including VSS operations.

Transitioning Exchange Server backups from Tivoli Storage FlashCopy Manager to Tivoli Storage Manager

Configure Tivoli Storage FlashCopy Manager so that you can access both a local and Tivoli Storage Manager server. This might be useful if you decide to move to a Tivoli Storage Manager environment and want to continue to interact with the locally managed snapshots until policy marks them for expiration.

To configure the Tivoli Storage FlashCopy Manager use the **Standalone** and Tivoli Storage Manager server configuration wizards from the Tivoli Storage FlashCopy Manager. To interact with a Tivoli Storage Manager server, run the **TSM** configuration wizard. To interact with a Tivoli Storage FlashCopy Manager server, run the **Standalone** configuration wizard. You can move from one type of server to another by running the corresponding configuration wizard at any time.

Note: Some command examples provided in this section are formatted on multiple lines. Issue each command on a single line.

Complete these tasks on the Tivoli Storage Manager server

Coordinate efforts with your Tivoli Storage Manager server administrator to get these tasks completed:

1. Select or create the policy definitions that will be used for each type of backup you plan to use. You can provide the administrator with the existing locally-defined policy settings in your Tivoli Storage FlashCopy Manager stand-alone environment. Use the GUI or the command-line interface of Data Protection for Exchange to retrieve this information.
2. Register your Data Protection for Exchange node name and password with the Tivoli Storage Manager **register node** command. For example:
`register node DPnodename DPpassword`
3. If not already defined in the Tivoli Storage Manager server, register the Tivoli Storage Manager backup-archive client node name and password for the workstation where the Exchange server is installed. For example:
`register node BAnodename BApasword`
4. Define the proxy node relationship for the Target Node and agent nodes with the Tivoli Storage Manager **grant proxynode** command. For example:
`grant proxynode target=DP agent=BAnodename`

Complete these tasks on the workstation running the Exchange Server

1. In the directory where the Data Protection for Exchange is installed, make a copy of the options file named dsm.opt. After you begin using the Tivoli Storage Manager server, the copy is used for access to the Tivoli Storage FlashCopy Manager stand-alone environment. One method of making the copy is to start the Exchange command line prompt from the Tivoli Storage FlashCopy Manager Snapin: In the Tivoli Storage FlashCopy Manager Snapin Tree view, an Exchange server node is displayed for each Exchange server instance on the computer.
 - a. Select an Exchange server instance in the tree view. The integrated command line and an Actions pane is displayed.
 - b. Launch the Data Protection for Exchange command line from the Actions pane. Select:

Launch Command Line

- c. To make a copy of the options file, enter:

```
copy dsm.opt dsm_local.opt
```

2. In the same directory, make a copy of the Data Protection for Exchange configuration file. For example:

```
copy tdpexc.cfg tdpexc_local.cfg
```

Preserve the contents of the local configuration file if:

- You have specified policy bindings during the use of Tivoli Storage FlashCopy Manager.
 - You will be updating the policy bindings to reflect changes in your policy specifications for your Tivoli Storage Manager server usage.
3. In the Tivoli Storage Manager backup-archive client installation directory, make a copy of the VSS requestor options file named dsm.opt. Use the Windows **copy** command. For example:

```
C:\Program Files\Tivoli\TSM\baclient>copy dsm.opt dsm_local.opt
```

4. In all of the files named dsm.opt, modify the TCPSERVERADDRESS line. Replace FLASHCOPYMANAGER with the IP address of the Tivoli Storage Manager server. For example:

```
TCPServeraddress 9.52.170.67
```

To accomplish this task, use a text editor like Notepad or Wordpad.

5. To access the Tivoli Storage FlashCopy Manager stand-alone environment during the transition period, open a Windows command prompt and change the directory to the Tivoli Storage Manager backup-archive client installation directory. The default is:

```
C:\Program Files\Tivoli\TSM\baclient
```

Create an alternate Windows service for the Tivoli Storage Manager Client Acceptor service by using the **dsmcutil** command. For example:

```
dsmcutil install cad /name:tsmcad4local  
/node:my_backup-archive_client_node  
/password:my_TSM_server_password  
/optfile:"C:\Program Files\Tivoli\TSM\baclient\dsm_local.opt"  
/httpport:1583
```

For more information on using the **dsmcutil** command, refer to the information on using the client service configuration utility in the Tivoli Storage Manager Windows Backup-Archive Clients Installation and User's Guide.

6. Create an alternate Windows service for the Tivoli Storage Manager remote agent service. For example:

```
dsmcutil install cad /name:tsmcad4local  
/node:my_backup-archive_client_node  
/password:my_TSM_server_password  
/optfile:"C:\Program Files\Tivoli\TSM\baclient\dsm_local.opt"  
/httpport:1583
```

7. Edit the dsm_local.opt file in the Data Protection for Exchange installation directory. Add this line:

```
HTTPPORT 1583
```

8. Start the alternate Tivoli Storage Manager Client Acceptor service:

```
dsmcutil start /name:tsmcad4local
```

9. Stop and restart the original Tivoli Storage Manager Client Acceptor service so that the new values in the `dsm.opt` file are activated. You can do this through the Windows Services GUI or by using the **dsmcutil** command:

```
dsmcutil stop /name:"TSM Remote Client Agent"
dsmcutil stop /name:"TSM Client Acceptor"
dsmcutil start /name:"TSM Client Acceptor"
```

10. As backups start occurring and are managed in the Tivoli Storage Manager server environment, you will need to phase out the remaining backups created in the Tivoli Storage FlashCopy Manager stand-alone environment. You can choose between two ways of achieving the phase-out:

- a. In the Tivoli Storage FlashCopy Manager stand-alone environment, define a time-based policy that will automatically cause the old backups to expire and be deleted. For example, if you want to expire each backup after it is 30 days old, update the time-based policy by using the command:

```
tdpexcc update policy mypolicy /daysretain=30
/tsmoptfile=dsm_local.opt
/configfile=tdpexc_local.cfg
```

You can also make this change using the Local Policy Management dialog that is accessed from the Utilities menu of the Data Protection for Exchange Backup/Restore GUI. Information on how to start the GUI is located below in the section describing how to access the Tivoli Storage FlashCopy Manager stand-alone environment.

The process of expiring backups when their age exceeds the `daysretain` limit depends upon a basic function that is run in the stand-alone environment. The function must include an operation that queries the backups. If you will not be regularly using the stand-alone environment client, you can use a scheduler to periodically start a command such as:

```
tdpexcc query tsm * /all
/tsmoptfile=dsm_local.opt
/configfile=tdpexc_local.cfg
```

For example, if your backups are created each week, then you can schedule the **query** command above to run once a week in order to cause the expiration of out-of-date backups.

The very last backup, that is created while running the stand-alone environment, will not be automatically deleted by the process of expiring the backups. For that, you will need to use the explicit delete operation, as described next.

- b. Alternatively, you can explicitly delete each backup when you determine that it is no longer needed. Use the Data Protection for Exchange **delete backup** command, or the Delete Backup (right mouse-click menu option) in the GUI Restore tab.
11. To access the Tivoli Storage FlashCopy Manager stand-alone environment:
 - a. Open the Automate tab to access the integrated command line prompt.
 - b. Start Tivoli Storage FlashCopy Manager stand-alone commands by appending the `/tsmoptfile` option, for example:

```
tdpexcc query tsm * /all
/tsmoptfile=dsm_local.opt
/configfile=tdpexc_local.cfg
```
 - c. Start the GUI (from the Command Line prompt) by issuing the GUI invocation command, for example:

```
tdpexc /tsmoptfile=dsm_local.opt
/configfile=tdpexc_local.cfg
```

12. If necessary, start the Tivoli Storage FlashCopy Manager stand-alone environment to restore from a backup that was created in that environment.
13. When the transition is complete and you no longer need to access the Tivoli Storage FlashCopy Manager stand-alone environment, you can remove the alternate services. To do this, use the Windows Services GUI or the **dsmcutil** command:

```
dsmcutil remove /name:tsmagent4local  
dsmcutil remove /name:tsmcad4local
```

Appendix A. Frequently asked questions

Answers related to frequently asked questions about Data Protection for Exchange are provided.

How do I compress my Data Protection for Exchange backups?

Use the **compression** option to instruct the Tivoli Storage Manager API to compress data before sending it to the Tivoli Storage Manager server. Compression reduces traffic and storage requirements.

Where you specify the **compression** option depends on the backup method that you are using:

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

See “Specifying Data Protection for Exchange options” on page 47 for more information about the **compression** option.

How do I encrypt my Data Protection for Exchange backups?

Use the **enableclientencryptkey** and **encryptiontype** options to encrypt Microsoft Exchange databases during backup and restore processing.

Where you specify these options depends on the backup method that you are using:

- For Legacy backups, specify these options in the Data Protection for Exchange options file.
- For VSS Backups, specify the encryption options in the backup-archive client options file that is used as the Local DSMAGENT Node. If the environment is configured for VSS offloaded backups, you must also specify the encryption options in the backup-archive client options file that is used as the Remote DSMAGENT Node. Review the encryption information available in the client documentation before attempting to encrypt your databases.

See “Specifying Data Protection for Exchange options” on page 47 for more information about the **enableclientencryptkey** and **encryptiontype** options.

How do I deduplicate my Data Protection for Exchange backups?

Use the **deduplication** option to enable client-side data deduplication. Client-side data deduplication is used by the Tivoli Storage Manager API to remove redundant data during backup processing before the data is transferred to the Tivoli Storage Manager server.

Where you specify these options depends on the backup method that you are using:

- For Legacy backups, specify the **deduplication** encryption options in the Data Protection for Exchange options file.

- For VSS Backups, specify the **deduplication** option in the backup-archive client options file that is used as the Local DSMAGENT Node. If the environment is configured for VSS offloaded backups, you must also specify the **deduplication** option in the backup-archive client options file that is used as the Remote DSMAGENT Node. Review the deduplication information available in the client documentation before attempting to encrypt your databases.

See “Specifying Data Protection for Exchange options” on page 47 for more information about the **deduplication** option.

What must I do before performing Data Protection for Exchange mailbox-level and mailbox item-level restores?

Review these prerequisites before you perform Data Protection for Exchange mailbox restore tasks:

“Security requirements for Data Protection for Exchange mailbox restore tasks on Exchange Server 2007” on page 32

“Security requirements for Data Protection for Exchange mailbox restore tasks on Exchange Server 2010” on page 32

“Prerequisites for Data Protection for Exchange mailbox restore tasks on Exchange Server 2007” on page 187

“Prerequisites for Data Protection for Exchange mailbox restore tasks on Exchange Server 2010” on page 187

How do I verify that I have Microsoft Exchange Server MAPI Client and Collaboration Data Objects (MAPI) correctly installed to perform Data Protection for Exchange mailbox restore operations on my Exchange Server?

When you use the Configuration Wizard in the MMC GUI to configure Data Protection for Exchange, the wizard performs a requirements check, which verifies whether the Microsoft Exchange Server MAPI Client and Collaboration Data Objects (MAPI) is correctly installed.

You can also issue the `tdpmapi.exe testmapi` command to verify whether the MAPI has been installed correctly.

How does a Data Protection for Exchange mailbox restore operation really do mailbox-level and mailbox item-level restores?

When a mailbox restore operation is initiated, Data Protection for Exchange performs the following actions:

1. Starts a session with the Tivoli Storage Manager server.
2. Queries the Tivoli Storage Manager server for a list of available backups.
3. Selects an appropriate backup based on user input.
4. For Exchange Server 2010 environments only, when necessary, creates an Exchange Recovery Database.
5. For Exchange Server 2007 environments only, when necessary, creates an Exchange Recovery Storage Group.
6. Restores the selected backup into the Exchange Server 2007 Recovery Storage Group or Exchange Server 2010 Exchange Recovery Database.

Note: Data Protection for Exchange restores only the databases necessary for the mailbox restore operation.

7. Copies individual mailboxes or individual mailbox items from the Exchange Recovery Storage Group (Exchange Server 2007) or Exchange Recovery Database (Exchange Server 2010) into the specified destination.

8. Removes the Exchange Recovery Storage Group (Exchange Server 2007) or Exchange Recovery Database (Exchange Server 2010) and the associated files.

How do I use Data Protection for Exchange to restore a deleted mailbox or items from a deleted mailbox?

Review “Restoring a deleted mailbox or items from a deleted mailbox” on page 100

How can I verify that my Exchange Server is ready to perform VSS operations?

Review “Verifying the Exchange Server is ready to perform VSS operations” on page 71

Can I back up and restore an Exchange 2007 Local Continuous Replication (LCR) or Cluster Continuous Replication (CCR) copy?

Exchange Server 2007 CCR and LCR replica copies can be backed up and restored by using the VSS method only. Microsoft does not allow Legacy backups of Exchange Server 2007 CCR and LCR replica copies. See “Continuous replication backups” on page 11 for more information. All VSS Restores of a CCR or LCR replica can be restored only into the running instance of a storage group (primary, recovery, or alternate). Microsoft does not support VSS Restores into a replica instance.

If you want to back up from the replica copy when running in a CCR or LCR environment, specify the **FromReplica True** backup option in the Protect tab of the MMC GUI. You can also specify the **/fromreplica** parameter with the **tdpexcc backup** command on the command-line interface. For CCR copies, you must run the backup while logged on to the secondary node of the cluster that currently contains the replica copy.

Can I back up and restore a Database Availability Group (DAG) copy?

Exchange Server 2010 DAG replica copies can be backed up and restored by using the VSS method. See “Restoring a Database Availability Group database copy” on page 105 for more information. All VSS Restores of a DAG replica can be restored only into the running instance of a database (primary, recovery, or alternate). Microsoft does not support VSS Restores into a replica instance.

Can I back up and restore a Standby Continuous Replication (SCR) replica copy?

No. Microsoft does not support VSS or Legacy 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. See “Continuous replication backups” on page 11 for more information.

What is a VSS restore into operation?

A **VSS restore into** operation can be performed on VSS backups of Exchange Server 2007 data and Exchange Server 2010 data.

When performed on Exchange Server 2007 data, a **VSS restore into** operation allows a VSS Backup of Exchange Server 2007 data to be restored into the Recovery Storage Group, an alternate storage group, or a relocated storage group.

When performed on Exchange Server 2010 data, a **VSS restore into** operation allows a VSS Backup of Exchange Server 2010 data to be restored into the Recovery Database, an alternate database, or a relocated database.

See “Restoring VSS Backups into alternate locations” on page 26 for more information.

What applications must I configure to use Data Protection for Exchange features?

The necessary applications are configured automatically by the configuration wizard.

Are VSS Restores restored into the Recovery Storage Group or Recovery Database?

Yes. Exchange Server 2007 VSS Restores can be restored into the Recovery Storage Group or into an alternate storage group. See “VSS restore considerations” on page 93 and “Restoring VSS Backups into alternate locations” on page 26 for more information. Exchange Server 2010 VSS Restores can be restored into the Recovery Database or into an alternate database. See “VSS restore considerations” on page 93 and “Restoring VSS Backups into alternate locations” on page 26 for more information.

Can I perform VSS operations in a clustered Exchange Server environment?

Yes, Data Protection for Exchange supports VSS operations in a clustered Exchange Server environment. See “Using VSS operations in a Single Copy Cluster environment” on page 36 for detailed information.

Why can I not perform VSS operations?

IBM Tivoli Storage Manager for Copy Services or IBM Tivoli Storage FlashCopy Manager must be installed. See “Software and operating system requirements” on page 53 detailed information.

Why can I not perform VSS Instant Restore even though I have SAN Volume Controller or a DS storage subsystem installed?

If you are using the Tivoli Storage Manager backup-archive client Version 5.5.1, install the IBM Tivoli Storage Manager for Copy Services Hardware Devices Snapshot Integration Module Version 5.5.1. If you are using the Tivoli Storage Manager backup-archive client Version 6.1 (or later), the Hardware Devices Snapshot Integration Module is automatically installed with the Tivoli Storage Manager backup-archive client. As a result, you do not have to manually install this module. See “Software and operating system requirements” on page 53 for detailed information.

Why is the VSS Instant Restore failing over to a VSS Fast Restore?

A failover can occur if the Exchange data is located on storage subsystems that are not supported for VSS Instant Restore. See “VSS Instant Restore” on page 17 for information about failovers.

Can I use VSS Instant Restore to restore a single database (partial restore)?

You cannot perform a partial restore (*/partial*) while using VSS Instant Restore. You must restore ALL databases within the specified storage group when performing a VSS Instant Restore. Although Data Protection for Exchange allows this operation to begin, it will either fail or complete with undesirable consequences. If you need to restore just one database from a VSS Backup that resides on local VSS shadow volumes on DS8000, SAN Volume Controller, Storwize V7000, or XIV disks, make sure to specify **InstantRestore False** in the Data Protection for Exchange GUI Restore tab, or specify */instantrestore=no* on the command-line interface. If VSS Instant Restore capability is needed for single databases, make sure to place these databases in their own storage group.

How can I use VSS and Legacy backups together in a common backup strategy?

See “Using VSS and Legacy Backups together (Exchange Server 2007)” on page 34 and “Back up to Tivoli Storage Manager storage versus back up to local shadow volumes” on page 38 for detailed information.

Can I restore Legacy backups and VSS Backups together?

No, Legacy backups and VSS Backups cannot be mixed due to a Microsoft limitation. See “Using VSS and Legacy Backups together (Exchange Server 2007)” on page 34 for more information.

Why are all my databases within an Exchange Server 2007 storage group dismounted when I perform a VSS Restore?

All databases are dismounted during VSS Restore processing due to a Microsoft requirement.

How does VSS Instant Restore work?

VSS Instant Restore is a volume-level hardware-assisted copy where target volumes (that contain the snapshot) are copied back to the original source volumes. A SAN Volume Controller, Storwize V7000, XIV, DS6000, or DS8000 storage subsystem is required to perform VSS Instant Restores. See “VSS Instant Restore” on page 17 for more information.

Now that I am performing VSS operations, why are there so many active backups?

Tivoli Storage Manager policy manages VSS Backups residing on local shadow volumes and on Tivoli Storage Manager server storage. This allows for different policies which can lead to an increase in the number of active backups. See “How Tivoli Storage Manager server policy affects Data Protection for Exchange” on page 29 and “Back up to Tivoli Storage Manager storage versus back up to local shadow volumes” on page 38 for more information.

Can I use UNC drive letters with VSS offloaded backups?

No, Data Protection for Exchange VSS offloaded backups will not process correctly if the Exchange storage group, database, or log location are specified with UNC-based drive letters. For example, the following path uses UNC drive letters and is not supported in a VSS offloaded backup:

```
\\host_srv1\c$\Program Files\Exchsrvr\First Storage Group
```

The following path is specified correctly:

```
C:\Program Files\Exchsrvr\First Storage Group
```

Drive-based names are supported when using a volume mount point, cluster drive, or both. For example:

```
X:\Exch_Mount_Point\Program Files\Exchsrvr\First Storage Group
```

However, UNC-based naming (as shown in the following example) is not supported when using a volume mount point, cluster drive, or both:

```
\\host_srv1\x$\Exch_Mount_Point\Program Files\Exchsrvr\First Storage Group
```

Why do I receive a TCP/IP timeout failure when I have Windows internal VSS tracing turned on?

Data Protection for Exchange VSS operations may timeout with a TCP/IP failure when Windows internal VSS tracing is turned on because of the additional time required to write entries to the trace file. You can avoid this issue by increasing the values for the Tivoli Storage Manager server *commtimeout* and *idletimeout* options or by decreasing the amount of Windows internal VSS tracing.

How do I perform mailbox-level and item-level backup and restore for Exchange?

With the Data Protection for Exchange mailbox restore feature, you can perform individual mailbox recovery and item-level recovery operations in

Microsoft Exchange Server 2007 and Microsoft Exchange Server 2010 environments on Data Protection for Exchange backups. See “Restoring individual mailbox and mailbox item-level data” on page 98 for details about this task.

How should I set up my policy settings for Data Protection for Exchange?

See the following sections for information about Data Protection for Exchange policy settings:

- “How Tivoli Storage Manager server policy affects Data Protection for Exchange” on page 29
- “Specifying Data Protection for Exchange options” on page 47

What should my Data Protection for Exchange performance settings be?

The default value of the *buffers* parameter (3) and the *buffersize* parameter (1024) have demonstrated the best performance in testing. However, environment factors such as network speed, physical database layout, machine resources, and Exchange Server resources all affect Data Protection for Exchange performance and should be considered when determining your settings. Note that the *buffers* and *buffersize* parameters apply to Legacy backups only.

See the following sections for more information:

- Chapter 8, “Data Protection for Exchange performance overview,” on page 131
- “Specifying Data Protection for Exchange options” on page 47
- “*/buffers* and */buffersize* parameters” (with the **backup** command) on “Backup optional parameters” on page 153.
- “*/buffers* and */buffersize* parameters” (with the **restore** command) on “Restore optional parameters” on page 167.
- “*/buffers* and */buffersize* parameter” (with the **set** command) on “Set positional parameters” on page 214.

Can I restore a Data Protection for Exchange database backup to flat files without using an Exchange Server? to a flat file without interrupting the Data Protection for ExchangeServer?

Yes, use the **restorefiles** command. See “Restorefiles command” on page 177 for details.

How do I schedule Data Protection for Exchange backups?

You can schedule Data Protection for Exchange backups by using the Tivoli Storage Manager backup-archive client scheduler or the MMC GUI scheduler.

See the following topics for more information:

- “Using the Tivoli Storage Manager scheduler” on page 109
- “Backup types” on page 6
- “Backup strategies” on page 32
- “Automating tasks” on page 108

What should I do if I get an “unknown Exchange API error” when running Data Protection for Exchange?

See Chapter 7, “Troubleshooting Data Protection for Exchange with VSS backup-restore support,” on page 117 about what to do when you encounter a problem.

How do I set up Data Protection for Exchange to run in a cluster?

The following sections contain information about using Data Protection for Exchange in a cluster environment:

- "Microsoft Cluster Server and Veritas Cluster Server support" on page 26
- "CLUSTERnode option" in "Specifying Data Protection for Exchange options" on page 47

Make sure the user can access the universal naming convention (UNC) share name of the directory specified by the *templogrestorepath* option. If that is not possible, specify a directory that has a valid share drive available and that is accessible to the user.

How do I know if my backup ran successfully?

A message displays that states the backup completed successfully. In addition, the Task Manager in the MMC GUI provides centralized information about the status of your tasks. Processing information is also available in the following files:

- Data Protection for Exchange log file (default: *tdpexc.log*)
This file indicates the date and time of a backup, data backed up, and any error messages or completion codes.
- Tivoli Storage Manager server activity log
Data Protection for Exchange logs information about backup and restore commands to the Tivoli Storage Manager server activity log. A Tivoli Storage Manager administrator can view this log for you if you do not have a Tivoli Storage Manager administrator user ID and password.
- Tivoli Storage Manager API error log file (default: *dserror.log*)

To prevent unsuccessful backups, consider the following information:

- Storage group databases in the Exchange Server Information Store must be mounted for a backup to complete successfully.
- An incremental back up of an Exchange Server database can fail if a previous full backup attempt of the same database terminated prematurely. If you receive Data Protection for Exchange errors ACN3025E or ACN4226E, perform a full backup of the database.
- A backup can fail if necessary transaction logs have been deleted or truncated. An error message will display stating that log files or patch files are missing. Perform the following steps to recover from this type of backup failure:
 1. Verify that only one product is performing backups on your system.
 2. Perform a full backup.
 3. If an error is still encountered, shut down and restart the Exchange Server, then perform a full backup.
 4. If an error is still encountered, reboot the machine, then perform a full backup.

How do the Exchange Server transaction logs get truncated?

The Exchange Server deletes transaction logs, not Data Protection for Exchange. As a result, the Exchange Server deletes only logs containing transactions that have been committed to the Exchange database. During high processing times, the Exchange Server might not delete all the transaction logs. Thus, it is possible that log files remain after the Data Protection for Exchange backup completes.

What do I do when this Tivoli Storage Manager server error displays: "ANR9999D snmode.c(xxxx): Error validating inserts etc."?

You do not have to do anything as this message can be ignored. Installing a later version of Tivoli Storage Manager server will prevent this message from being displayed.

What authority must I have to perform a Data Protection for Exchange backup and restore?

See "Security" on page 31 for the required authority to perform Data Protection for Exchange backup and restore tasks.

Should I use the same *nodename* as used by my Backup-Archive client?

Legacy backups: Use different node names to simplify scheduling, data separation, and policy management tasks.

VSS Backups: You must use different node names.

See "Specifying Data Protection for Exchange options" on page 47 for more information.

How do I set up LAN-free to back up Data Protection for Exchange over my SAN?

See "LAN-free data movement" on page 132 for more information.

Can I run Data Protection for Exchange with multiple sessions backing up?

For Legacy backups, yes: you can run separate instances of Data Protection for Exchange to back up different storage groups.

See "Backup strategies" on page 32 for more information.

Microsoft does not recommend simultaneous snapshot creation for VSS backups.

Can I delete a single Data Protection for Exchange backup from the Tivoli Storage Manager server based on the date that the backup was performed?

For Legacy backups, no. It is not possible to delete a single Data Protection for Exchange backup from the Tivoli Storage Manager server. With VSS backups, you can delete a single backup.

Appendix B. 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.

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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

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 `dsmatrr` 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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