Tivoli Storage Manager for Databases
Version 5.5.4

Data Protection for Microsoft SQL Server
Installation and User's Guide
Note

Before using this information and the product it supports, read the information in "Notices" on page 283.

Edition notice

This edition applies to version 5, release 5, modification 4 of IBM Tivoli Storage Manager for Databases Data Protection for Microsoft SQL Server (product numbers 5608-APD, 5608-CSS) and to all subsequent releases and modifications until otherwise indicated in new editions. This edition replaces SC32-9059-02.

US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.
Contents

Tables ........................................ ix

Preface ....................................... xi
Who should read this guide ................... xi
Publications .................................... xii
Data Protection for SQL documentation ..... xii
IBM Tivoli Storage Manager library .......... xii
Accessing terminology online ................ xiv
Accessing publications online ............... xiv
Ordering publications ......................... xiv

Support information ........................... xv
Determining if the problem is a Tivoli Storage Manager or SQL issue ....... xv
Problem determination assistance ............. xvi
Installation Problems: Creating an installation-log file ............... xvi
Tivoli Technical Training ....................... xvii
IBM Tivoli Storage Manager Web site .......... xvii
IBM Tivoli Storage Manager for Databases Web site ................... xvii
Searching knowledge bases .................... xvii
Obtaining fixes ................................ xviii
Receiving weekly support updates ............ xviii
Contacting IBM Software Support .......... xix

Conventions used in this book ............... xxii
Typeface conventions ........................ xxii

Chapter 1. Data Protection for SQL
Overview ..................................... 1
New product features for 5.5.4 ............... 1
Additional Data Protection for SQL features .... 1
SAN Volume Controller 5.1 FlashCopy ......... 3
Using Data Protection for SQL with SAN Volume Controller ............... 3
Data Protection for SQL and SAN Volume Controller configurations ....... 5
Using space-efficient target volumes with SAN Volume Controller 5.1 .... 7
Additional considerations when using SAN Volume Controller .......... 10
Backup overview ................................ 10
Legacy Backup ................................ 10
VSS Backup ................................ 10
Backup types .................................. 14
Backup strategies .............................. 16
How Tivoli Storage Manager server policy affects Data Protection for SQL .... 19
Using VSS and Legacy Backups together .... 20
Using VSS operations in a cluster ............ 22
Using Data Protection for SQL in a Microsoft Cluster Server environment .... 23
Using Data Protection for SQL in a Veritas Cluster Server environment .... 24
Restore methods .............................. 25
Legacy Restore ................................ 25
VSS Restore ................................ 25
VSS Fast Restore .............................. 26
VSS Instant Restore ........................... 26
Restore types .................................. 27
Security ....................................... 28
Performance ................................... 29

Chapter 2. Installing .......................... 31
Software and operating system requirements .... 31
Hardware requirements ....................... 35
Installing on a local system (standard) ....... 37
Installing the language packs .................. 38
Installing Data Protection for SQL in an MSCS or VCS environment ....... 39
Installing Data Protection for SQL on a local system (silent) ............... 39

Chapter 3. Configuring Data Protection for SQL .............................. 41
Part I: Configuration overview ................ 42
Back up to Tivoli Storage Manager storage versus back up to local shadow volumes ........ 42
How Tivoli Storage Manager server policy affects Data Protection for SQL ....... 45
Recommended Tivoli Storage Manager policy settings .......................... 47
Data Protection for SQL node name:
Recommended settings ....................... 49
Proxy node definitions (VSS Backups) ......... 50
Specifying Data Protection for SQL options .......................... 52
Specifying Data Protection for SQL preferences .......................... 55
Setting automatic expiration (VSS and Legacy) .......................... 55
Part II: Configuration procedure ............... 59
1. On the Tivoli Storage Manager server: 59
2. On the machine running the SQL Server: 60
3. On the machine running the Off-loaded backups (VSS only): .......... 61
Part III: Verify your configuration .......... 62

Chapter 4. Using the graphical user interface ......................... 63
Menu bar ..................................... 63
Edit menu .................................... 63
View menu ................................... 66
Utilities menu ................................ 67
Help menu ................................... 68
Toolbar ....................................... 68
Backup and restore windows ................. 68
Expanded backup options ..................... 68
Selecting databases and displaying information .... 69
GUI backup tasks ............................. 71

© Copyright IBM Corp. 1997, 2010
ACO00005E: Out of memory. Stop other processes and try the operation again. .......................... 221
ACO00053E: License file (licensefile) could not be opened. .................................................. 222
ACO00054E: Read failure on license file (licensefile). ......................................................... 222
ACO00055E: Write failure on license file (licensefile). ....................................................... 222
ACO00056E: Data in the license file (licensefile) is not in a valid format. .......................... 222
ACO00057E: The checksum in the license file (licensefile) does not match the license string text. 223
ACO00058E: The 'Try and Buy' license has expired. ............................................................. 223
ACO00059E: The checksum in the license file (licensefile) is not in a valid format. .............. 222
ACO00060E: The 'Try and Buy' license has expired. ............................................................. 223
ACO00061E: The checksum in the license file (licensefile) does not match the license string text. 223
ACO00062E: The 'Try and Buy' license has expired. ............................................................. 223
ACO00063E: The checksum in the license file (licensefile) does not match the license string text. 223
ACO00064E: The 'Try and Buy' license has expired. ............................................................. 223
ACO00065E: The checksum in the license file (licensefile) does not match the license string text. 223
ACO00066E: The 'Try and Buy' license has expired. ............................................................. 223
ACO00067E: The checksum in the license file (licensefile) does not match the license string text. 223
ACO00068E: The 'Try and Buy' license has expired. ............................................................. 223
ACO00069E: The checksum in the license file (licensefile) does not match the license string text. 223
ACO00070E: The 'Try and Buy' license has expired. ............................................................. 223
ACO00071E: The checksum in the license file (licensefile) does not match the license string text. 223
ACO00072E: The 'Try and Buy' license has expired. ............................................................. 223
ACO00073E: The checksum in the license file (licensefile) does not match the license string text. 223
ACO00074E: The 'Try and Buy' license has expired. ............................................................. 223
ACO00075E: The checksum in the license file (licensefile) does not match the license string text. 223
ACO00076E: The 'Try and Buy' license has expired. ............................................................. 223
ACO00077E: The checksum in the license file (licensefile) does not match the license string text. 223
ACO00078E: The 'Try and Buy' license has expired. ............................................................. 223
ACO00079E: The checksum in the license file (licensefile) does not match the license string text. 223
ACO00080E: The 'Try and Buy' license has expired. ............................................................. 223
ACO0104E: Invalid option: command: .......................................................... 224
ACO0103E: Invalid option for the specified command: .................................................... 224
ACO0102E: Invalid command: .......................................................... 224
ACO0101E: Invalid argument: .......................................................... 224
ACO0100E: Incomplete command: .......................................................... 224
ACO0153I: Performance stats: Operation canceled by user.................................................. 226
ACO0152I: Performance stats: seconds spent in function .................................................... 227
ACO0151I: Performance stats: seconds spent in apicall API calls...................................... 227
ACO0154E: The Data Protection for Microsoft SQL Server application client cannot work with the version of the Tivoli Storage Manager API you have installed. Please install version version.release.level or greater. .................................................. 227
ACO00160E: An authentication error occurred with your stored Tivoli Storage Manager password. 228
ACO00161E: Authentication error. The password entered is not valid. You are not logged on to the Tivoli Storage Manager server. .......................................................... 228
ACO00162E: The password entered do not match. Please enter them again............................... 228
ACO00163E: The directory path needs to be fully-qualified. .................................................. 229
ACO00167E: The fully-qualified file name is too long. ......................................................... 230
ACO00200E: File (filename) could not be opened for reading. .......................................... 230
ACO00201E: File (filename) could not be opened for writing. ............................................. 230
ACO00202E: Read failure on file (filename). .................................................................. 230
ACO00203E: Write failure on file (filename). .................................................................. 231
ACO00204E: File (filename) could not be closed. ............................................................... 231
ACO00205E: File (filename) statistics could not be obtained. .............................................. 231
ACO00206E: Directory (directory) could not be created. .................................................... 231
ACO00207E: Directory path (directorypath) is too long. .................................................... 232
ACO00208E: There is not enough disk space for the operation attempted. .......................... 232
ACO00209E: The rename of file (filename1) to (filename2) failed. ...................................... 232
ACO00210E: The Tivoli Storage Manager high level qualifier is too long. ........................... 232
ACO00211E: The Tivoli Storage Manager low level qualifier is too long. ........................... 233
ACO00212E: The Tivoli Storage Manager filespace name is too long. ................................. 233
ACO00213E: The maximum number of objects allowed per Tivoli Storage Manager transaction is too small. .......................... 233
ACO00214E: The backup object's management class backup copy group does not exist. ........ 234
ACO00215E: All backup objects do not have the same management class backup copy destination. 234
ACO00216E: Unable to obtain space information for volume (volumename). ..................... 234
ACO00217E: The Tivoli Storage Manager filespace name is invalid. ................................. 235
ACO00218E: The Tivoli Storage Manager high level qualifier is invalid. ............................ 235
ACO00219E: The Tivoli Storage Manager low level qualifier is invalid. ............................ 235
ACO00256E: The password in your Tivoli Storage Manager options file has expired. Please change your password on the Tivoli Storage Manager server using the 'change password' command and then either change or remove the password value in your options file. .................................................. 235
ACO00257E: Your password has expired. ..................................................................... 236
ACO00258E: You did not enter a valid password. ............................................................... 236
ACO00259E: The password you entered for verification does not match the password you entered for your new password. Your password will not be changed. .................................................. 236
ACO00260E: Password successfully changed. ................................................................... 237
ACO00261E: There are no backups for the server named servername. ............................... 237
ACO00263E: Failed to start Web browser with a return code of returncode. ....................... 237
ACO00264E: Could not find the default browser defined. An attempt will be made to use Microsoft Internet Explorer. .................................................. 238
ACO00265E: Could not find Internet Explorer. ................................................................... 238
ACO00266E: Could not find the Tivoli Storage Manager HTML books. ............................. 238
ACO00267E: The verify password entered does not match the new password entered. .......... 238
ACO00300E: Invalid restore type. ................................................................................ 239
ACO00301E: Invalid backup type. ................................................................................ 239
ACO00301E: Invalid backup type. ................................................................................ 239
ACO00301E: Invalid backup type. ................................................................................ 239
ACO0351E: Invalid trace keyword - 'keyword' ................................................................ 239
ACO357E: Unable to open trace output file
file-name. ........................................ 240
ACO366E: Unable to close trace output file
file-name. ............................... 240
ACO367E: Unable to write to trace file tracefile.
Tracing disabled. ............................... 240
ACO368E: Invalid trace file name (name too long). 241
ACO383E: Specifying the trace file 'link' as a
symbolic link is not allowed. .................. 241
ACO384E: Symbolic link 'linkname' to 'target' was
successfully deleted. ............................ 241
ACO385E: Unable to delete symbolic link 'link'. ....... 242
ACO476E: Specifying the error log 'link' as a
symbolic link is not allowed. .................. 242
ACO487E: Initialization functions cannot open the
error log: log-name. errno = errno-value. ........ 243
ACO495E: Failure writing to a Tivoli Storage
Manager log or log-related file: file-name, errno =
errno-value, reason. .............................. 243
ACO496E: TDP is converting the log-file from
continuous (pruning) mode to wrapping mode.
This process may take several minutes. .......... 243
ACO497E: TDP is converting the log-file from
wrapping mode to continuous (pruning) mode.
This process may take several minutes. ........... 244
ACO498E: count log records processed. ............ 244
ACO501E: Invalid Proxy Configuration Detected:
Target Node 'targetnode' is not listed as a valid
node to proxy to for Node Name 'nodename'. .... 244
ACO501T: Invalid Proxy Configuration Detected:
Target Node 'targetnode' is not listed as a valid
node to proxy to for Node Name 'nodename'. .... 245
ACO515E: Invalid DSMAGENT Node
configuration found for node 'dsmagentnode'. .... 245
ACO516E: The Windows console event handler
received a 'event' console event. ................. 245
ACO517E: An unexpected error was encountered.
TDP function name : function-name TDP function :
function-desc TDP return code : TSM-rc TDP file :
file-name (line-number) ...................... 246
ACO518E: Backups selected for restore must have
the same backup location (TSM or LOCAL). ....... 246
ACO519E: The VSS operation failed with rc =
returncode. ..................................... 246
ACO520E: Failed to connect to Local DSMAGENT
Node 'localdsmagentnode' at address:port
'address:portnumber'. Verify that the TSM Client
Acceptor Daemon (CAD) is installed, configured,
and running properly. ......................... 247
ACO521E: Pruning functions cannot open one of
the Tivoli Storage Manager prune files: log-name.
errno = errno-value. ............................ 247
ACO3000I: Data Protection for SQL: Starting backup
type backup of database database name from server
name. ........................................... 248
ACO3001I: Data Protection for SQL: backup type
backup of database database name from server name
completed successfully. ......................... 248
ACO3002E: Data Protection for SQL: backup type
backup of database database name from server name
failed, rc = return code. ....................... 248
ACO3003I: Data Protection for SQL: Starting restore
type restore of backup object object name to
database database name on server server name. ... 249
ACO3004I: Data Protection for SQL: restore type
restore of backup object object name to database
database name on server server name completed
successfully. ................................... 249
ACO3005E: Data Protection for SQL: restore type
restore of backup object object name to database
database name on server server name failed. .... 249
ACO3006I: Data Protection for SQL: Starting
backup for server server name. ................. 250
ACO3007I: Data Protection for SQL: Backup of server
servername is complete. Total SQL backups
selected: number selected Total SQL backups
attempted: number attempted Total SQL backups
completed: number completed Total SQL backups
excluded: number excluded Throughput rate: rate
Kb/Sec Total bytes transferred: bytes Elapsed
processing time: time Secs .................... 250
ACO3008I: Data Protection for SQL: Backup of server
servername is complete. Total SQL backups
selected: number selected Total SQL backups
attempted: number attempted Total SQL backups
completed: number completed Total SQL backups
excluded: number excluded Total SQL backups
inactivated: number inactivated Throughput rate: rate
Kb/Sec Total bytes transferred: bytes Elapsed
processing time: time Secs .................... 250
ACO3009I: Data Protection for SQL: backup type
backup of database database name from server name
canceled by user. .............................. 251
ACO3010I: Data Protection for SQL: Starting
restore for server servername. ................. 251
ACO3011I: Data Protection for SQL: Restore from
server server name to server server name is complete.
Total database backups inspected: number inspected
Total database backups requested for restore:
number requested Total database backups restored:
number restored Total database backups skipped:
number skipped Throughput rate: rate Kb/Sec Total bytes
transferred: bytes Elapsed processing time: time
Secs ........................................... 251
ACO3012I: Data Protection for SQL: restore type
restore of backup object object name to database
database name from server server name canceled by
user. ........................................... 252
ACO3013I: Data Protection for SQL: Starting
Inactivate processing for backup objects from server
servername ....................................... 252
ACO3014I: Data Protection for SQL: Inactivate
processing complete Total database backups
inspected: number inspected Total database backups
requested for inactivation: number requested Total
database backups inactivated: number inactivated
Total database skipped: number skipped Elapsed
processing time: time Secs .................... 252
ACO3015I: Data Protection for SQL: Inactivating backup type backup backup object. 
ACO5050I: A new configuration file was created. 
ACO5051I: The configuration file cannot be found, using default settings. 
ACO5052E: An error occurred trying to set the requested configuration option. 
ACO5053E: The value for the option option is not valid. See the TDP SQLC Help Set output or the User’s Guide for valid Set command parameters. 
ACO5054I: The configuration option was set successfully. 
ACO5056I: The logfile log file could not be pruned. 
ACO5059W: The logfile log file name is greater than the maximum allowed. Processing will continue using a logfile name of logfile in the current directory. 
ACO5060E: A Tivoli Storage Manager API error has occurred. 
ACO5061E: A Microsoft SQL API error has occurred. 
ACO5063I: The logfile_name log file did not need pruning. 
ACO5064W: The logfile_name log file could not be opened for writing. The log was not pruned and there will be no logging of events. 
ACO5065E: The value specified for the /SQLUser option does not match the registry entry. 
ACO5091E: PASSWORDACCESS is Generate. Either the stored password is incorrect or there is no stored password. If you do not have a stored password, use the -TSMPassword=xxx option to set and store your password. 
ACO5097I: Data Protection for SQL is not configured for VSS operations. 
ACO5098E: Error obtaining VSS information from Local DSM Agent Node: ‘localsmagentnode’. 
ACO5124E: Invalid command. Data Protection for SQL only supports VSS backup type of FULL. 
ACO5125E: Invalid command. Data Protection for SQL does not support OFFLOAD with the Legacy backup method. 
ACO5126E: Invalid command. Data Protection for SQL only supports Legacy backups with a backup destination of TSM. 
ACO5127E: Invalid command. Data Protection for SQL does not support OFFLOAD with the specified backup destination. 
ACO5128E: The VSS operation failed with rc = returncode. 
ACO5129E: Data Protection for SQL is unable to run VSS operations. A valid VSS license file (acssql.lic) could not be located. 
ACO5170E: Missing, blank, or invalid Local DSM Agent Node Name is not allowed. 
ACO5171E: Invalid command. Data Protection for SQL only supports restoring VSS backup types of FULL and COPY. 
ACO5177E: Invalid DSM Agent Node configuration found for node ‘dsmagentnode’. 
ACO5186E: The VSS writer didn’t return any selectable backup components for the specified database(s). Ensure that the SQL Server VSS writer service has been started. 
ACO5187E: Multiple backup objects with conflicting backup destinations were found for one or more of the specified database(s). The /OBJECT and/or /BACKUPDESTINATION options should be used to restore a specific database. 
ACO5188E: BOTH may not be specified for /BACKUPDESTINATION, only TSM or LOCAL are valid. 
ACO5204E: One or more of the specified databases do not exist or are unavailable for backup. 
ACO5400E: The Virtual Device Interface is not registered with the Common Object Model. 
ACO5401E: The Virtual Device Interface could not be created. 
ACO5402E: The Virtual Device Set could not be created. 
ACO5403E: The configuration of the Virtual Device Set could not be obtained. 
ACO5404E: The Virtual Device Set could not open a virtual device. 
ACO5405E: An unknown virtual device error has been detected. 
ACO5406E: The SQL server closed a virtual device prematurely. 
ACO5407E: The SQL server aborted the operation. 
ACO5420E: 
ACO5421E: Received the following from the MS COM component: SQL message . . . . 266 
ACO5422E: Received the following from the MS SQL server: SQL message . . . . 266 
ACO5423E: The following string is too long: string . . . . 266 
ACO5424E: Could not connect to SQL server; SQL server returned: SQL message . . . . 267 
ACO5425E: The SQL server is not running: SQL message . . . . 267 
ACO5426E: The SQL log on does not have the Sysadmin role: SQL message . . . . 267 
ACO5427E: The SQL server version is less than 7.0: SQL message . . . . 267 
ACO5428E: The SQL server is not on the local machine: SQL message . . . . 268 
ACO5429E: Could not obtain an event from SQL server: SQL message . . . . 268 
ACO5430E: The SQL Server Name is blank or NULL. . . . . 269 
ACO5431E: Multiple dbnames are not allowed. . . . . 269 
ACO5432E: Equal numbers of the /RELOCATE and /TO options must be specified. . . . . 269 
ACO5433E: Wildcards are not allowed as part of the following parameters/options: . . . . 270 
ACO5434E: The following options cannot be specified together: . . . . 270
## Tables

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Data Protection for SQL key features</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Snapshot restore and delete behavior on 5.1 space-efficient target volumes</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>Snapshot restore and delete behavior on SAN Volume Controller 5.1 space-efficient target volumes</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>Backup strategy characteristics</td>
<td>21</td>
</tr>
<tr>
<td>5</td>
<td>Minimum software and operating system requirements for Legacy Backup and Restore operations</td>
<td>31</td>
</tr>
<tr>
<td>6</td>
<td>Minimum software and operating system requirements for basic VSS operations</td>
<td>32</td>
</tr>
<tr>
<td>7</td>
<td>Minimum software and operating system requirements for VSS Off-loaded Backup</td>
<td>33</td>
</tr>
<tr>
<td>8</td>
<td>Minimum software and operating system requirements for VSS Instant Restore</td>
<td>34</td>
</tr>
<tr>
<td>9</td>
<td>Minimum hardware requirements for Legacy Backup and Restore operations</td>
<td>35</td>
</tr>
<tr>
<td>10</td>
<td>Minimum hardware requirements for VSS Backup and Restore operations</td>
<td>35</td>
</tr>
<tr>
<td>11</td>
<td>Minimum hardware requirements for VSS offloaded backup operations</td>
<td>36</td>
</tr>
<tr>
<td>12</td>
<td>Minimum hardware requirements for VSS Instant Restore operations</td>
<td>36</td>
</tr>
<tr>
<td>13</td>
<td>List of applications to configure</td>
<td>41</td>
</tr>
<tr>
<td>14</td>
<td>Required node names for basic VSS operations</td>
<td>50</td>
</tr>
<tr>
<td>15</td>
<td>Required node names for VSS off-loaded backups</td>
<td>51</td>
</tr>
<tr>
<td>16</td>
<td>GUI tab functions</td>
<td>69</td>
</tr>
<tr>
<td>17</td>
<td>Data Protection for SQL commands</td>
<td>83</td>
</tr>
<tr>
<td>18</td>
<td>Data Protection for SQL optional parameters</td>
<td>85</td>
</tr>
<tr>
<td>19</td>
<td>Silent installation options</td>
<td>205</td>
</tr>
<tr>
<td>20</td>
<td>Silent installation features (base client only)</td>
<td>206</td>
</tr>
<tr>
<td>21</td>
<td>Silent installation features (Language Packages only)</td>
<td>206</td>
</tr>
<tr>
<td>22</td>
<td>Silent installation transforms</td>
<td>206</td>
</tr>
</tbody>
</table>
Preface

The subject of this publication is Data Protection for SQL, a component of the IBM Tivoli Storage Manager for Databases product.

Data Protection for SQL performs online backups of Microsoft® SQL Server databases to Tivoli Storage Manager storage.

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

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

- SQL Server 2000 (32-bit and IA64)
- SQL Server 2005 (32-bit, IA64, and x64)
- SQL Server 2008 (32-bit, IA64, and IA64)
- SQL Server 2008 R2 (32-bit, IA64, and x64)

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

Changes since the previous edition are marked with a vertical bar ( | ) in the left margin.

Who should read this guide

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

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

- Microsoft SQL Server
- Tivoli Storage Manager server
- Tivoli Storage Manager backup-archive client
- Tivoli Storage Manager Application Programming Interface

It is also assumed that you have an understanding of one of the following operating systems:

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

This section lists related IBM Tivoli Storage Manager publications. It also describes how to access Tivoli® publications online and how to order Tivoli publications.

Data Protection for SQL documentation

Data Protection for SQL provides several types of documentation that assist in understanding, planning, and using Data Protection for SQL.

Installation and User’s Guide

The IBM Tivoli Storage Manager for Databases Data Protection for Microsoft SQL Server Installation and User’s Guide 5.5.4 provides the most detailed information regarding how to install, configure, and use Data Protection for SQL 5.5.4 in a Windows environment.

GUI Online Help

GUI online help is provided for specific information related to tasks that are performed in the Data Protection for SQL GUI. After launching the GUI, go to Help->DP for SQL Help. The online help displays. See Chapter 4, “Using the graphical user interface,” on page 63 for additional information.

Command Line Help

Command line help is also provided for specific information related to tasks that are performed on the Data Protection for SQL command line. Enter tdpsqlc help on the Data Protection for SQL command line interface for a list of available help topics. See “Help command” on page 173 for additional information.

IBM Tivoli Storage Manager library

The following documents are available in the IBM Tivoli Storage Manager library:

- **Tivoli Storage FlashCopy Manager for Windows Installation and User’s Guide**
  Provides information on installing, configuring, and using Tivoli Storage FlashCopy Manager

- **IBM Tivoli Storage Manager for Windows Backup-Archive Client Installation and User’s Guide**
  Provides information for an end-user to install, configure, and use the Tivoli Storage Manager client on Windows operating systems

- **IBM Tivoli Storage Manager for UNIX and Linux Backup-Archive Clients Installation and User’s Guide**
  Provides information for an end-user to install, configure, and use the Tivoli Storage Manager client on UNIX® and Linux® operating systems

- **IBM Tivoli Storage Manager for Windows Administrator’s Guide**
  Provides concepts and procedures for configuring and customizing the Tivoli Storage Manager server on Windows operating systems

- **IBM Tivoli Storage Manager for Windows Administrator’s Reference**
  Provides details about administrative commands, server options, and server utilities for Tivoli Storage Manager server on Windows operating systems

- **IBM Tivoli Storage Manager for AIX Administrator’s Guide**
  Provides concepts and procedures for configuring and customizing the Tivoli Storage Manager server on AIX® operating systems
• IBM Tivoli Storage Manager for AIX Administrator’s Reference
  Provides details about administrative commands, server options, and server utilities for Tivoli Storage Manager server on AIX operating systems

• IBM Tivoli Storage Manager for Sun Solaris Administrator’s Guide
  Provides concepts and procedures for configuring and customizing the Tivoli Storage Manager server on Sun Solaris operating systems

• IBM Tivoli Storage Manager for Sun Solaris Administrator’s Reference
  Provides details about administrative commands, server options, and server utilities for Tivoli Storage Manager server on Sun Solaris operating systems

• IBM Tivoli Storage Manager Messages
  Provides explanations and suggested actions for messages issued by the Tivoli Storage Manager server program for storage management services, the administrative client graphical-user interface, administrative command line client, data protection clients, and backup-archive client

• IBM Tivoli Storage Manager: Problem Determination Guide
  Describes how to diagnose problems with Tivoli Storage Manager

• IBM Tivoli Storage Manager Using the Application Program Interface
  Provides information to help you add Tivoli Storage Manager application-programming interface calls to an existing application and to write programs with general-use program interfaces that obtain the services of Tivoli Storage Manager

• IBM Tivoli Storage Manager for SAN for AIX Storage Agent User’s Guide
  Provides an overview of LAN-free data transfer and detailed explanations about configuring and using the Tivoli Storage Manager client, storage agent, and server

• IBM Tivoli Storage Manager for SAN for HP-UX Storage Agent User’s Guide
  Provides an overview of LAN-free data transfer and detailed explanations about configuring and using the Tivoli Storage Manager client, storage agent, and server

• IBM Tivoli Storage Manager for SAN for Linux Storage Agent User’s Guide
  Provides an overview of LAN-free data transfer and detailed explanations about configuring and using the Tivoli Storage Manager client, storage agent, and server

• IBM Tivoli Storage Manager for SAN for Sun Solaris Storage Agent User’s Guide
  Provides an overview of LAN-free data transfer and detailed explanations about configuring and using the Tivoli Storage Manager client, storage agent, and server

• IBM Tivoli Storage Manager for SAN for Windows Storage Agent User’s Guide
  Provides an overview of LAN-free data transfer and detailed explanations about configuring and using the Tivoli Storage Manager client, storage agent, and server
Accessing terminology online

The Tivoli Software Glossary includes definitions for many of the technical terms related to Tivoli software. The Tivoli Software Glossary is available at the following Tivoli software library Web site:

http://publib.boulder.ibm.com/tividd/glossary/tivoliglossarymst.htm

The IBM® Terminology Web site consolidates the terminology from IBM product libraries in one convenient location. You can access the Terminology Web site at the following Web address:

http://www.ibm.com/software/globalization/terminology

Accessing publications online

The product CD contains the publications that are in the product library. The format of the publications is PDF, HTML, or both. To access the publications using a Web browser, open the infocenter.html file. The file is in the appropriate publications directory on the product CD.

IBM posts publications for this and all other Tivoli products, as they become available and whenever they are updated, to the Tivoli software information center Web site. Access the Tivoli software information center by first going to the Tivoli software library at the following Web address:


Click Tivoli Product manuals to access the product library at the Tivoli software information center.

Tip: If you print PDF documents on other than letter-sized paper, set the option in the File → Print window that allows Adobe® Reader to print letter-sized pages on your local paper.

Ordering publications

You can order many Tivoli publications online at the following Web site:


You can also order by telephone by calling one of these numbers:

• In the United States: 800-879-2755
• In Canada: 800-426-4968

In other countries, contact your software account representative to order Tivoli publications.
Support information

If you have a problem with your IBM software, you want to resolve it quickly. IBM provides the following ways for you to obtain the support you need:

- Searching knowledge bases: You can search across a large collection of known problems and workarounds, Technotes, and other information.
- Obtaining fixes: You can locate the latest fixes that are already available for your product.
- Contacting IBM Software Support: If you still cannot solve your problem, and you need to work with someone from IBM, you can use a variety of ways to contact IBM Software Support.

For more information about these three ways of resolving problems, see “Contacting IBM Software Support” on page xix.

Determining if the problem is a Tivoli Storage Manager or SQL issue

This section provides information to help determine if the problem is a Data Protection for SQL issue or an SQL server issue.

For Legacy operations:

- Use the Backup or Restore utility provided in the SQL Server administrator program to see if the problem can be recreated.
- If the error message "AC05350E An unknown SQL API error has occurred" is displayed, the SQL server encountered an unexpected situation. Microsoft assistance may be needed if the problem continues.
- Data Protection for SQL error messages occasionally contain an HRESULT code. Use this code to search Microsoft documentation and the Microsoft Knowledge Base for resolution information.

For VSS operations: Try recreating the problem with the Microsoft VSHADOW application. This application can run backups using the Microsoft SQL VSS APIs. If the problem is recreatable with VSHADOW, then the problem most likely exists within the VSS provider or the SQL server. Microsoft ships 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.

For Windows Server 2008 and later, try recreating the problem with the Microsoft DISKSHADOW application. This application is shipped with Windows Server 2008 and later.

Microsoft provides specific tracing for troubleshooting VSS issues. Consult Microsoft’s documentation for details.

Problem determination assistance

If an error condition occurs during a Data Protection for SQL event, there are several sources of information you can view to help determine the problem:

- Data Protection for SQL logs information on backup, restore, and delete commands to the Tivoli Event Console.
- Data Protection for SQL logs information, by default, to the tdpsql.log file in the directory where Data Protection for SQL is installed. This file indicates the date and time of a backup, data backed up, and any error messages or completion codes. This file is very important and should be monitored daily.
- The Tivoli Storage Manager API logs API error information, by default, to the dsierror.log file in the directory where Data Protection for SQL is installed. No backup statistics are kept in this log. The dsierror.log file cannot be marked as read-only.
- The SQL Server logs information to the SQL Server error log. SQL Server error log information can be viewed using the SQL Server Enterprise Manager (SQL Server 2000) or SQL Server Management Studio (SQL Server 2005 and later).
- The Tivoli Storage Manager scheduler logs information to both the dsmsched.log and the dsmerror.log files. By default, these files are located in the directory where the Tivoli Storage Manager Backup-Archive client is installed.

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 can 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:
```

- Windows Event Log.
- For VSS operations, view the dsmerror.log file in the backup-archive client installation directory.

Installation Problems: Creating an installation-log file

In the event a silent installation fails, gather the following information to assist Customer Support when evaluating your situation:

- Operating system level
- Service pack
- Hardware description
- Installation package (CD or electronic download) and level
- Any Windows event log relevant to the failed installation
- Windows services active during the failed installation (for example, anti-virus software)
- Whether you are logged on to the local 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 installations)

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"/lv setup.log"

**Tivoli Technical Training**

For Tivoli technical training information, refer to the following IBM Tivoli
Education Web site:


**IBM Tivoli Storage Manager Web site**

Technical support information and publications are available at the following

By accessing the Tivoli Storage Manager home page, you can access subjects that
interest you. You can also keep up-to-date with the newest Tivoli Storage Manager
product information.

**IBM Tivoli Storage Manager for Databases Web site**

The IBM Tivoli Storage Manager for Databases Web site contains a knowledge base
of articles and information related to backup and restore issues. Access this
information at: If you plan to perform VSS operations, the IBM Tivoli Storage
Manager for Copy Services Web site contains a knowledge base of VSS-related
articles and information:


**Searching knowledge bases**

You can search the available knowledge bases to determine whether your problem
was already encountered and is already documented.

**Searching the information center**

IBM provides extensive documentation that can be installed on your local
computer or on an intranet server. You can use the search function of this
information center to query conceptual information, instructions for completing
tasks, and reference information.
Searching the Internet

If you cannot find an answer to your question in the information center, search the Internet for the latest, most complete information that might help you resolve your problem.

To search multiple Internet resources for your product, go to this product support Web site: [http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html](http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html) and look for the section to search the support knowledge base. From this section, you can search a variety of resources including:

- IBM technotes
- IBM downloads
- IBM Redbooks®
- Forums and newsgroups

Obtaining fixes

A product fix might be available to resolve your problem. To determine what fixes are available for your IBM software product, follow these steps:

2. Click Downloads in the Software Support table.
3. Follow the search instructions provided on the page.
4. Click Search.
5. From the list of downloads returned by your search, click the name of a fix to read the description of the fix and to optionally download the fix.

For more information about the types of fixes that are available, see the IBM Software Support Handbook at [http://techsupport.services.ibm.com/guides/handbook.html](http://techsupport.services.ibm.com/guides/handbook.html).

Receiving weekly support updates

To receive weekly e-mail notifications about fixes and other software support news, follow these steps:

2. Click Assistance in the Software Support table.
3. Click Request e-mail updates in the Additional Assistance support links table.
4. If you have already registered for My support, sign in and skip to the next step. If you have not registered, click register now. Complete the registration form using your e-mail address as your IBM ID and click Submit.
5. Click Edit profile.
6. In the Products list, select Software. A second list is displayed.
7. In the second list, select the product segment, Storage Management. A third list is displayed.
8. In the third list, select the product sub-segment, Data Protection. A list of applicable products is displayed.
9. Select the products for which you want to receive updates, for example, IBM Tivoli Storage Manager for Databases.
10. Click Add products.

11. After selecting all products that are of interest to you, click Subscribe to email on the Edit profile tab.

12. Select Please send these documents by weekly email.

13. Update your e-mail address as needed.

14. In the Documents list, select Software.

15. Select the types of documents that you want to receive information about.

16. Click Update.

If you experience problems with the My support feature, you can obtain help in one of the following ways:

**Online**
Send an e-mail message to ershelpdesk@us.ibm.com, describing your problem.

**By phone**
Call 1-800-IBM-4You (1-800-426-4968).

**Contacting IBM Software Support**

IBM Software Support provides assistance with product defects.

Before contacting IBM Software Support, your company must have an active IBM software maintenance contract, and you must be authorized to submit problems to IBM. The type of software maintenance contract that you need depends on the type of product you have:

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

  **Online**
  Go to the Passport Advantage Web site at [http://www.lotus.com/services/passport.nsf/WebDocs/Passport_Advantage_Home](http://www.lotus.com/services/passport.nsf/WebDocs/Passport_Advantage_Home) and click How to Enroll.

  **By phone**
  For the phone number to call in your country, go to the IBM Software Support Web site at [http://techsupport.services.ibm.com/guides/contacts.html](http://techsupport.services.ibm.com/guides/contacts.html) and click the name of your geographic region.

- For customers with Subscription and Support (S & S) contracts, go to the Software Service Request Web site at [https://techsupport.services.ibm.com/ssr/login](https://techsupport.services.ibm.com/ssr/login).


- For IBM eServer™ software products (including, but not limited to, DB2 and WebSphere products that run in zSeries, pSeries, and iSeries environments), you can purchase a software maintenance agreement by working directly with an IBM sales representative or an IBM Business Partner. For more information about support for eServer software products, go to the IBM Technical Support Advantage Web site at [http://www.ibm.com/servers/eserver/techsupport.html](http://www.ibm.com/servers/eserver/techsupport.html).
If you are not sure what type of software maintenance contract you need, call 1-800-IBMSERV (1-800-426-7378) in the United States. From other countries, go to the contacts page of the IBM Software Support Handbook on the Web at [http://techsupport.services.ibm.com/guides/contacts.html](http://techsupport.services.ibm.com/guides/contacts.html) and click the name of your geographic region for phone numbers of people who provide support for your location.

To contact IBM Software support, follow these steps:
1. “Determining the business impact”
2. “Describing problems and gathering information”
3. “Submitting problems” on page xx

**Determining the business impact**

When you report a problem to IBM, you are asked to supply a severity level. Therefore, you need to understand and assess the business impact of the problem that you are reporting. Use the following criteria:

**Severity 1**
- The problem has a *critical* business impact. You are unable to use the program, resulting in a critical affect on operations. This condition requires an immediate solution.

**Severity 2**
- The problem has a *significant* business impact. The program is usable, but it is severely limited.

**Severity 3**
- The problem has *some* business impact. The program is usable, but less significant features (not critical to operations) are unavailable.

**Severity 4**
- The problem has *minimal* business impact. The problem causes little impact on operations, or a reasonable circumvention to the problem was implemented.

**Describing problems and gathering information**

When describing a problem to IBM, 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 is the version and release level of your Tivoli Storage Manager server product? Enter the `query status` command to determine this information. For example:
  
  `query status`

- 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 you create the problem again? If so, what steps were performed to create the problem?

- Did you make any changes to the system? For example, did you make changes to the hardware, operating system, networking software, and so on.

- Are you currently using a workaround for the problem? If so, be prepared to explain the workaround when you report the problem.
Submitting problems

You can submit your problem to IBM Software Support in one of two ways:

Online
Click **Submit and track problems** on the IBM Software Support site at [http://www.ibm.com/software/support/probsub.html](http://www.ibm.com/software/support/probsub.html). Type your information into the appropriate problem submission form.

By phone
For the phone number to call in your country, go to the contacts page of the **IBM Software Support Handbook** at [http://techsupport.services.ibm.com/guides/contacts.html](http://techsupport.services.ibm.com/guides/contacts.html) and click the name of your geographic region.

If the problem you submit is for a software defect or for missing or inaccurate documentation, IBM Software Support creates an Authorized Program Analysis Report (APAR). The APAR describes the problem in detail. Whenever possible, IBM Software Support provides a workaround for you to implement until the APAR is resolved and a fix is delivered. IBM publishes resolved APARs on the IBM product support Web pages daily, so that other users who experience the same problem can benefit from the same resolutions.

For more information about problem resolution, see [Searching knowledge bases](#) and [Obtaining fixes](#).

Conventions used in this book

This guide uses several conventions for special terms and actions, operating system-dependent commands and paths.

This guide uses the following typeface conventions:

**Bold**
- Commands, keywords, authorization roles, or other information that you must use.
- Example: Log on to the server as **root** user.

*italics*
- Values or variables that you must provide.
- Emphasized words and phrases.
- Example: The node name of the *production node* and *backup node* must not be the same.

**bold italics**
- Options and parameters.
- Example: Specify the value for the *compression* option.

**monospace**
- Directories, parameters, URLs, and output examples.
- Example: The product is installed in the `C:\program files\tivoli\tsm\client\ba` directory.

**UPPER CASE**
- Environment variables associated with Tivoli Storage Manager, operating systems, or SQL Server.
- Example: Make sure the DSM_DIR environment variable is set correctly.
Accessibility features for Data Protection for SQL

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 Data Protection for SQL:

- 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 Information Center, and its related publications, are accessibility-enabled. The accessibility features of the information center are described at Accessibility and keyboard shortcuts in the information center.

Keyboard navigation

Standard shortcut and accelerator keys are used by the product and are documented by the operating system. Refer to the documentation provided by your operating system for more information.

Interface information

You can enlarge information on the product windows using facilities provided by the operating systems on which the product is run. For example, in a Microsoft Windows environment, you can lower the resolution of the screen to enlarge the font sizes of the text on the screen. Refer to the documentation provided by your operating system for more information.

IBM and accessibility

See the IBM Human Ability and Accessibility Center for more information about the commitment that IBM has to accessibility.

Magnifying what is displayed on the screen

You can enlarge information on the product windows using facilities provided by the operating systems on which the product is run. For example, in a Microsoft Windows environment, you can lower the resolution of the screen to enlarge the font sizes of the text on the screen. Refer to the documentation provided by your operating system for more information.
Navigating the interface using the keyboard

Standard shortcut and accelerator keys are used by the product and are documented by the operating system. Refer to the documentation provided by your operating system for more information.

Reading syntax diagrams

This section describes how to read the syntax diagrams used in this book. 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).

<table>
<thead>
<tr>
<th>Syntax Diagram Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abbreviations:</td>
<td>─────KEYWOrd───────</td>
</tr>
<tr>
<td>Uppercase letters denote the shortest acceptable truncation. If an item appears entirely in uppercase letters, it cannot be truncated.</td>
<td></td>
</tr>
<tr>
<td>You can type the item in any combination of uppercase or lowercase letters.</td>
<td></td>
</tr>
<tr>
<td>In this example, you can enter KEYWO, KEYWORD, or KEYWOrd.</td>
<td></td>
</tr>
<tr>
<td>Symbols:</td>
<td>* Asterisk</td>
</tr>
<tr>
<td>Enter these symbols exactly as they appear in the syntax diagram.</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>Space</td>
</tr>
<tr>
<td>Variables:</td>
<td>─────KEYWOrd──── ─────var_name───────</td>
</tr>
<tr>
<td>Italicized lowercase items (var_name) denote variables.</td>
<td></td>
</tr>
<tr>
<td>In this example, you can specify a var_name when you enter the KEYWORD command.</td>
<td></td>
</tr>
</tbody>
</table>
**Syntax Diagram Description**

**Example**

**Repetition:**

An arrow returning to the left means you can repeat the item.  

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

A footnote by the arrow references the number of times you can repeat the item.  

Notes:

1. Specify *repeat* as many as 5 times.

**Required Choices:**

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

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

**Optional Choice:**

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

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

**Defaults:**

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

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

**Repeatable Choices:**

A stack of items followed by an arrow returning to the left means you can select more than one item or, in some cases, repeat a single item.  

In this example, you can choose any combination of A, B, or C.
<table>
<thead>
<tr>
<th>Syntax Diagram Description</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Syntax Fragments:</td>
<td></td>
</tr>
<tr>
<td>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.</td>
<td>![Diagram]</td>
</tr>
</tbody>
</table>
Chapter 1. Data Protection for SQL Overview

Product overview information related to new features, backup methods, backup types, restore methods, restore types, performance, security, and available documentation is provided for Data Protection for SQL 5.5.4.

New product features for 5.5.4

Data Protection for SQL provides the following key features:

Table 1. Data Protection for SQL key features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Referred to as:</th>
<th>For more information see:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restore and recover of a database to the date and time specified (Legacy backups only)</td>
<td>/restoredate and /restoretimete parameters</td>
<td>“Restore command” on page 132</td>
</tr>
<tr>
<td>Manage capacity for VSS backups that reside on local shadow volumes(^1)</td>
<td>query managedcapacity command</td>
<td>“Query Managedcapacity command” on page 130</td>
</tr>
<tr>
<td>Delete a VSS Backup of a SQL Server database</td>
<td>delete backup command</td>
<td>“Delete Backup command” on page 162</td>
</tr>
<tr>
<td>Integrate with Tivoli Storage FlashCopy Manager</td>
<td>Advanced VSS support(^2)</td>
<td>Appendix B, “Transitioning SQL Server backups from Tivoli Storage FlashCopy Manager to Tivoli Storage Manager,” on page 201</td>
</tr>
</tbody>
</table>

\(^1\) 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.

\(^2\) To use VSS features, you must also install one of the following:

- IBM Tivoli Storage Manager for Copy Services Microsoft SQL VSS Integration Module (required for basic VSS operations)
- IBM Tivoli Storage Manager for FlashCopy Manager Microsoft SQL VSS Integration Module and IBM Tivoli Storage Manager for FlashCopy Manager Hardware Devices Snapshot Integration Module (required for VSS Instant Restore operations)
- IBM Tivoli Storage FlashCopy Manager

Additional Data Protection for SQL features

With Data Protection for SQL, you can back up and restore Microsoft SQL Server online databases to Tivoli Storage Manager server storage using either the command-line or graphical user interface (GUI).

Data Protection for SQL helps you protect and manage SQL Server data with these tasks:

- Legacy full backups, differential backups, and transaction log backups of SQL Server databases.
• Legacy individual file group backups, individual file backups, and set backups (containing sets of file groups and files) of SQL Server data.
• Full VSS snapshot backups of SQL Server 2005 or later databases running on Windows Server. This feature is not available in IA64 environments.
• Full VSS off-loaded snapshot backups of SQL Server 2005 or later databases running on Windows Server.
• Legacy restores of full, differential, and transaction log backups of SQL Server databases.
• Legacy restores of individual file groups, individual files, and set backups (containing sets of file groups and files) of SQL Server data.
• Partial Legacy restores of specific database file groups.
• VSS Restores of full snapshot backups of SQL Server 2005 or later databases (running on Windows Server) from Tivoli Storage Manager server storage or local VSS disks.
• Use multiple SQL Server instances on the same system as Data Protection for SQL.

Note: You can access only one SQL Server per execution of Data Protection for SQL from either the command line or the GUI.
• Legacy backups using data striping in parallel threads using parallel sessions.
• Automate scheduled backups. See Chapter 6, “Using the Tivoli Storage Manager scheduler,” on page 189.
• Perform expanded restore operations on backup objects such as relocating, restoring to named marks, and partially restoring full backups.
• Restore Legacy backups for a point in time.
• Restore Legacy database backups to a different SQL Server.
• Retain, with a Legacy backup, the information needed to recreate or move SQL databases or files, such as sort order, code page, and Unicode information, or file group and file logical and physical names. The meta object information is retained on the Tivoli Storage Manager server separately from the backup data objects.
• Deactivate all active Legacy backup objects, all objects of a particular Legacy backup type, or specific objects.
• Deactivate Legacy backup objects older than a specified number of days.
• Set automatic expiration of backup objects based on version limit and retention period. See "Recommended Tivoli Storage Manager policy settings" on page 47.
• Query any local SQL Server or any connected Tivoli Storage Manager server for database, status, and configuration information.
• Monitor results through the Data Protection for SQL activity log and automatically prune the activity log.
• Set Tivoli Storage Manager connection information options to Tivoli Storage Manager servers.
• Set Tivoli Storage Manager security and performance options.
• Participate in Microsoft Cluster Server (MSCS) and Veritas Cluster Server (VCS) fail-over clusters.
• Apply failover clustering without unclustering. Failover clustering is useful for both maintenance of and restoration of the master database.
• Obtain online context-sensitive task, and concept help.
• Globalization Support
SAN Volume Controller 5.1 FlashCopy

Thin provisioning or the ability to allocate less physical storage than the declared size of a logical storage volume has been available in the SAN Volume Controller since the 4.3 release. A thinly provisioned volume is referred to as a space-efficient (SE) volume.

SAN Volume Controller Version 5.1 introduces an important new capability in its copy services related to use of SE volumes as FlashCopy targets. Although prior releases of SAN Volume Controller supported use of SE target volumes, it was not possible until version 5.1 to do a FlashCopy restore from SE target volumes, or from fully allocated target volumes, when a background copy of all blocks from source to target had not completed. The enhanced copy services in SAN Volume Controller 5.1 allow 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 minimizes 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:

\[ S \rightarrow T4 \rightarrow T3 \rightarrow T2 \rightarrow T1 \]

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 SQL.

The following sections provide guidance and recommendations for effective use of Data Protection for SQL with SAN Volume Controller 5.1.

Using Data Protection for SQL with SAN Volume Controller

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

Version 4.1.x of the VSS provider for SAN Volume Controller 5.1 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 the SAN Volume Controller, 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 5.1 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 SQL support of SAN Volume Controller 5.1:

- 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.

Making a transition from fully allocated targets to SE targets is accomplished by treating fully allocated targets as if they were SE when the background copy rate is set to 0.

- When using SE backup versions:
  - Do not mix persistent and nonpersistent VSS snapshots. Use of a nonpersistent VSS snapshot following one or more persistent snapshots causes the older persistent snapshots to be deleted when the nonpersistent snapshot is deleted.
A VSS backup with `backupdestination` set to TSM creates a nonpersistent VSS snapshot. Therefore, do not follow a series of backups to local with `backupdestination` set to TSM. Instead, set `backupdestination` to both to send data to Tivoli Storage Manager while preserving local snapshot backup versions. Put another way, `backupdestination=LOCAL` and `backupdestination=TSM` are mutually exclusive settings. Do not use both in a backup strategy.

- Enable `autoexpand` for the SE target volumes, to avoid out-of-space conditions.
- Allocate enough space for SE target volumes to hold 120% of the data expected to change on the source volume in the time between snapshots. For example, if a database changes at a rate of 20% per day, VSS backups are done every 6 hours, and a steady rate of change throughout the day is assumed, the expected change rate between snapshots is 5% of the source volume \((20/4)\). Therefore, the space allocated to the SE target volumes should be \(1.2 \times 5\% = 6\%\) 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 SQL 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 SQL and SAN Volume Controller configurations**

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

*Table 2. Snapshot restore and delete behavior on 5.1 space-efficient target volumes*

<table>
<thead>
<tr>
<th>Use Cases / Objectives</th>
<th>SVC Settings</th>
<th>VSS Provider Settings</th>
<th>Data Protection for SQL Settings</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>- production application data resides on standard volumes - keep 14 snapshot backup versions - use minimum storage space for snapshot backup versions. Full physical copy not required - perform 2 VSS backups per day</td>
<td>- 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</td>
<td>- set background copy rate = 0</td>
<td>- set policy to retain 14 local backup versions - schedule snapshot backups as preferred using backup destination=local</td>
<td>- 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.</td>
</tr>
<tr>
<td>Use Cases / Objectives</td>
<td>SVC Settings</td>
<td>VSS Provider Settings</td>
<td>Data Protection for SQL Settings</td>
<td>Comments</td>
</tr>
<tr>
<td>------------------------</td>
<td>-------------</td>
<td>-----------------------</td>
<td>-------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>- production application data resides on standard volumes - keep 1 snapshot backup version - use minimum storage space for snapshot backup versions. Full physical copy not required - perform 1 VSS backup per day and also send the backup to Tivoli Storage Manager</td>
<td>- 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</td>
<td>- set background copy rate = 0</td>
<td>- set policy to retain 2 local backup versions - schedule snapshot backups as preferred using backup destination=both</td>
<td>- set policy for local snapshot backups to retain N+1 backup versions so that N snapshot backups are available for restore. Otherwise, a local backup version may not be available should a VSS backup fail after the prior backup was deleted</td>
</tr>
<tr>
<td>- production application data resides on standard volumes - keep 1 snapshot backup version - full physical copy is required - minimize overhead of background copies - perform 1 VSS backup per day and also send the backup to Tivoli Storage Manager</td>
<td>- create one standard target vol for each source vol to be protected - add standard target volumes to the VSS free pool</td>
<td>- use default background copy rate (50) - configure to use Incremental FC</td>
<td>- set policy to retain 1 local backup version - schedule snapshot backups as preferred using backup destination=both</td>
<td>- 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</td>
</tr>
<tr>
<td>- production application data resides on standard volumes - keep 2 snapshot backup versions - full physical copies are required for local backup versions - perform VSS backups every 12 hours with one backup daily sent to Tivoli Storage Manager</td>
<td>- create 3 standard target vols for each source vol to be protected - add standard target volumes to the VSS free pool</td>
<td>- use default background copy rate (50)</td>
<td>- set policy to retain 3 local backup versions - schedule VSS backups as follows: - backup destination = local at 11:00 - backup destination = both at 23:00</td>
<td>- set policy for local snapshot backups to retain N+1 backup versions so that N snapshot backups are available for restore.</td>
</tr>
</tbody>
</table>
### Table 2. Snapshot restore and delete behavior on 5.1 space-efficient target volumes (continued)

<table>
<thead>
<tr>
<th>Use Cases / Objectives</th>
<th>SVC Settings</th>
<th>VSS Provider Settings</th>
<th>Data Protection for SQL Settings</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>- production application data resides on standard volumes - keep 4 snapshot backup versions - use minimum storage space for snapshot backup versions. Full physical copy not required - perform VSS backups every 6 hours with one backup daily sent to Tivoli Storage Manager</td>
<td>- create 5 SE target vols for each source vol to be protected - enable autoexpand for the SE target volumes - add SE target volumes to the VSS free pool</td>
<td>- set background copy rate = 0</td>
<td>- set 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</td>
<td>- set policy to retain N+1 backup versions so that N snapshot backups are available for restore</td>
</tr>
<tr>
<td>- production application data resides on SE volumes - keep 2 snapshot backup versions - full physical copies are required for local backup versions - perform VSS backups every 6 hours with one backup daily sent to Tivoli Storage Manager</td>
<td>- create 3 SE target vols for each source vol to be protected - allocate same percentage of real storage as for source volumes - add SE target volumes to the VSS free pool</td>
<td>- use default background copy rate (50)</td>
<td>- set 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</td>
<td>- set policy for local snapshot backups to retain N+1 backup versions so that N snapshot backups are available for restore - allows thin provisioning for both source and target vols and lets them grow together</td>
</tr>
</tbody>
</table>

---

### Using space-efficient target volumes with SAN Volume Controller 5.1

SAN Volume Controller 5.1 requires special considerations when using space-efficient target volumes.

Data Protection for SQL supports VSS Instant Restore operations when multiple backup versions exist on SAN Volume Controller 5.1 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 SQL manages multiple backup versions on SAN Volume Controller 5.1 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 5.1 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 3. Snapshot restore and delete behavior on SAN Volume Controller 5.1 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 creation of backups in the table is s1, s2, s3, s4.

**Verifying snapshot creation**

Use the IBM VSS provider `ibmvcfg` command to verify whether snapshots are created on SAN Volume Controller 5.1 space-efficient target volumes:

1. In a Windows command prompt, issue `ibmvcfg list infc -l` to display the FlashCopy mapping attributes. The Tgt Type column displays the FlashCopy mappings for the volumes attached to the current host.
2. Verify that the IBM VSS provider type states SVC Pegasus.

**Migration considerations**

If upgrading to Tivoli Storage FlashCopy Manager 2.2 and IBM VSS hardware provider 4.1, existing snapshots on SAN Volume Controller 5.1 space-efficient target volumes that were created with a background copy rate of zero are not considered space efficient. Delete these snapshots and create new snapshots using a copy rate value of zero according to instructions provided in the IBM VSS hardware provider 4.1 documentation. Also, if an IBM VSS hardware provider is installed that is earlier that version 4.1, uninstall that previous version before installing version 4.1.
Guidelines for SAN Volume Controller 5.1 environments

Review the following guidelines before attempting backup operations. Further information is available at [http://publib.boulder.ibm.com/infocenter/svcic/v3r1m0/index.jsp](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.
- If space-efficient virtual disks (VDisks) are used for backup targets, set the IBM VSS provider background copy value to zero by issuing the `ibmvcfg set backgroundCopy 0` command. To make the changes effective, restart the IBM VSS system service after issuing the command. For more details about configuring SAN Volume Controller 5.1 and the IBM VSS Hardware Provider for space-efficient target volumes, read the SAN Volume Controller 5.1 documentation.
- Do not mix FlashCopy COPY and NOCOPY backups in FlashCopy mappings.
- 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 5.1 volumes, and the VDisks in the VSS_FREE pool are space efficient, then VSS Instant Restore from multiple backups is possible. However, the VSS Instant Restore operation in this environment is destructive.
- The Windows host must be attached to an SAN Volume Controller 5.1 cluster. The volumes assigned to the Windows host must be participating in the SAN Volume Controller 5.1 cluster.
- Make sure that IBM VSS hardware provider version 4.1 (or later) is installed. This provider must be configured to accommodate multiple backup versions on SAN Volume Controller 5.1 space-efficient target volumes.
- Multiple snapshots on SAN Volume Controller 5.1 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 5.1:

- You can remotely mount NOCOPY FlashCopy backups. However, SAN Volume Controller 5.1 is 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 4.1 documentation for important information regarding these two issues:

- IBM VSS hardware provider prerequisites (for example, Microsoft test fixes).
- Configuration instructions for creating FlashCopy mappings of NOCOPY backups on SAN Volume Controller 5.1.

**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.
Additional considerations when using SAN Volume Controller

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.

Backup overview

Data Protection for SQL provides several methods of backing up SQL Server data.

Legacy Backup

A Legacy Backup creates a copy of all or part of a SQL database or logs on Tivoli Storage Manager storage media.

Data Protection for SQL provides selection mechanisms and the logic that are required to back up and restore SQL data. For example, when you initiate a backup operation, Data Protection for SQL:

1. Starts a session with a Tivoli Storage Manager server using the Tivoli Storage Manager API and information contained in a client options file.
2. Starts a session with the SQL Server using the SQL-SMO interface.
3. Instructs the SQL Server using the SQL VDI interface to begin a backup of the selected database objects.
4. Receives data from the SQL Server and sends it to the Tivoli Storage Manager server.
5. Ends the Tivoli Storage Manager and SQL Server sessions.

Note:

1. Data Protection for SQL can compress SQL data before sending it to the Tivoli Storage Manager server.
2. Metadata:

When a backup is performed, Data Protection for SQL retains information about the SQL Server and database. This information is available for query and restore operations after the backup is completed. The information about the names and sizes of the database file groups and files is stored along with the database data, as a sub-object. This sub-object is referred to as metadata. You will need this "meta" sub-object when you need information about individual database file groups and files.

VSS Backup

A VSS Backup uses Microsoft Volume Shadow Copy Service technology to produce an online snapshot (point-in-time consistent copy) of SQL data.

A VSS Backup uses Microsoft Volume Shadow Copy Service technology to produce an online snapshot (point-in-time consistent copy) of SQL 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 SQL server is not in "backup mode" for an extended period of time because the length of time to perform the snapshot is
usually measured in seconds and not hours. 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 SQL 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 SQL 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 SQL data backed up to Tivoli Storage Manager server storage, the SQL data on the snapshot volume is sent to the Tivoli Storage Manager server. Once 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 SQL” on page 19 for details regarding how Tivoli Storage Manager proceeds in this situation.

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

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

**Characteristics of VSS Backups**

The following characteristics are true of VSS Backup:

- Full backups only are supported. Log, differential, file, group, and set backup types are not supported. However, Legacy differential and Legacy log backups can be applied after a full VSS Backup has been restored.
- Backup granularity is at the 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 off-loaded to an alternate machine as resource relief for production servers.
- Backups can be performed in a Microsoft Cluster Server (MSCS) or Veritas Cluster Server (VCS) environment.

**Planning requirements for VSS Backups**

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 SQL.
• Continue to schedule and perform Legacy backups in your strategy.
• Make sure you have a well-defined and tested recovery plan that meets your service level objectives.
• Use single hardware LUNs for each database or group of databases that will be backed up and restored together as a unit.
• Use basic disks.
• 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 SQL, make sure to consult your VSS provider documentation for a complete understanding of your VSS implementation.
• Avoid performing parallel VSS Backups as this feature can create problems.
• Do not place multiple volumes on the same LUN. Microsoft recommends that you configure a single volume/single partition/single LUN as 1 to 1 to 1.

VSS Service overview
The VSS Service manages and directs three VSS software applications that are used during VSS operations.

VSS Writer
The VSS Writer is the Microsoft SQL Server. It is installed with the SQL Server (2005 and later) software and requires the following minor configuration tasks:
• The SQL VSS Writer service should be set to "Automatic." This enables the service to start automatically when the machine is rebooted.
• Start the SQL VSS Writer.

VSS Requestor
The VSS Requestor is Tivoli Storage Manager.

VSS Provider
The VSS provider manages the volumes where the SQL data resides. Configuration requirements are based upon the type of VSS provider used in your environment. For example:
• If you are using the standard Windows System provider (referred to as the Windows VSS System Provider throughout this book), no configuration is required.
• If you are using a VSS software provider, consult the documentation provided with your VSS software provider.
• If your SQL storage is configured on a disk storage subsystem and you plan to perform Off-loaded backups or full-copy snapshot backups (versus copy-on-write (COW) snapshot backups as described in "VSS Backup" on page 10), you must install a VSS hardware provider.
• If you plan to perform VSS Instant Restores, be aware that IBM System Storage SAN Volume Controller, DS6000, DS8000, and IBM XIV Storage System Model 2810 (Gen 2) are the only storage subsystems that support VSS Instant Restores and require a VSS provider. Therefore, if you use IBM System Storage SAN Volume Controller, DS6000, or DS8000, you must install and configure IBM System Storage Support for Microsoft
Virtual Disk and Volume Shadow Copy Services as your VSS hardware provider in order to perform VSS Instant Restores. VSS provider support and documentation for IBM System Storage disk storage subsystems is available at the following Web site: [http://www.redbooks.ibm.com/abstracts/SG247373.html?Open](http://www.redbooks.ibm.com/abstracts/SG247373.html?Open).

If you use IBM XIV Storage System Model 2810 (Gen 2), you must install and configure IBM XIV VSS HW Provider. VSS provider support and documentation for IBM XIV VSS HW Provider is available at the following Web site: [http://www.ibm.com/support/docview.wss?uid=ssg1S4000800](http://www.ibm.com/support/docview.wss?uid=ssg1S4000800)


**System Provider:**

The System Provider refers to the default VSS provider that is available with Windows Server.

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

**Software or Hardware Provider:**

A software or hardware provider (that is not the default Windows System provider) requires these configuration settings when planning for VSS Backups.

- Do not use version 2.2.2 of the IBM XIV VSS Hardware Provider with Tivoli Storage Manager. There are defects in that specific version that prevent VSS Instant Restore from working properly.
- If a hardware provider is used, you must configure the disks that contain SQL data as basic.
- Place databases files for each database or group of databases that will be backed up and restored together as a unit on their own dedicated logical volume.
- Place logs for each database on their own logical volume.
- Do not place non-SQL data on storage volumes that are dedicated to SQL.
- When using hardware snapshot providers, do not share database LUNs with other databases or applications.
- IBM N-series and NetApp systems require the Data ONTAP VSS Hardware Provider.
- Make sure to read and follow specific installation and configuration instructions in the documentation provided by your VSS provider vendor.
DS6000, DS8000, SAN Volume Controller, and XIV Gen 2 requirements:

DS6000, DS8000, SAN Volume Controller, and XIV Gen 2 require these configuration settings when planning for VSS Backups.

- Place databases files for each database or group of databases that will be backed up and restored together as a unit on their own dedicated logical volume.
- Place logs for each database or group of databases that will be backed up and restored together as a unit on their own logical volume.
- Do not place non-SQL data on storage volumes that are dedicated to SQL.
- When using hardware snapshot providers, do not share database LUNs with other databases or applications.
- (SAN Volume Controller only) Note that 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 storage subsystems should be initiated at a frequency greater than the time required for the background copy process to complete.
- If you delete a LOCAL snapshot that is stored on a SAN Volume Controller (SVC) 5.1 Space Efficient volume (SEV) that has multiple dependent targets, you must delete them in the same order in which you created them. That is, you must delete the oldest one first, followed by the second oldest, and so on. Failure to delete them in this order can cause removal of other snapshots of the same source.

Off-loaded Backup

An off-loaded backup uses an alternate machine to move the data to the Tivoli Storage Manager server.

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

Backup types

Data Protection for SQL offers an expanded range of backup types that allows flexibility for your environment and processing needs.

Data Protection for SQL provides six types of backup:

Full database backup (Legacy and VSS)

Data Protection for SQL backs up an entire SQL Server database and the portion of the transaction log necessary to provide a consistent database state. With both full and differential backups, the copy includes enough information from any associated transaction logs to make a backup consistent with itself. The portion of the log included contains only the transactions that occur from the beginning of the backup until its completion.

Note: Legacy backups are a stream of bytes that Data Protection for SQL stores on the Tivoli Storage Manager server. VSS Backups differ since they are at the volume and file-level. In a situation where a SQL Server database is not fully allocated, a Legacy backup might transfer a smaller amount of data for a Tivoli Storage Manager backup than for a VSS Backup since a VSS Backup transfers the entire file, regardless of its allocation.
**Differential backup (Legacy only)**

Data Protection for SQL backs up only the data pages in a SQL Server database changed since the last full backup and a portion of the transaction log. This is equivalent to an incremental backup on the Tivoli Storage Manager Backup-Archive Client.

**Log backup (Legacy only)**

Data Protection for SQL backs up only the contents of a SQL Server database transaction log since the last successful log backup. To do the first log backup, you need to have done a full backup or its equivalent first. Log backups normally follow full backups. The portion of the log included in full and differential backups is not equivalent to a log backup. Additionally, in full and differential backups, the log is not truncated as it is during a log backup. However, a log backup following a full or differential backup will include the same transactions as a full or differential. Log backups are not cumulative as are differential; they must be applied against a base backup and in the correct order.

**Note:** A log backup in SQL Server terms is not equivalent to an incremental backup in Tivoli Storage Manager terms.

**File backup (Legacy only)**

Data Protection for SQL backs up only the contents of a specified SQL Server logical file. This can ease the scheduling for backing up very large databases by allowing you to back up different sets of files during different scheduled backups. File, group, and set backups must be followed by a log backup, but a full is not required.

**Group backup (Legacy only)**

Data Protection for SQL backs up only the contents of a specified SQL Server file group. This allows you to back up just the set of database tables and indexes within a specific group of files.

**Set backup (Legacy only)**

Data Protection for SQL backs up the contents of specified SQL Server file groups and files as a unit.

**Examples**

See “Legacy Backup output examples” on page 99 for samples of various backup types using the command line interface. Also, planning information regarding choosing the best strategy for your backup requirements is available in “Backup strategies” on page 16.
Backup strategies

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

Strategies defined by backup type

Some commonly used strategies (based upon backup type) are described as follows:

Full backup only (Legacy and VSS)

This approach is best for SQL databases that are relatively small because it implies that the entire database is backed up each time. Each full backup takes longer to perform, but the restore process is most efficient because only the most recent (or other appropriate) full backup need be restored. This is the appropriate strategy for system databases such as master, model, and msdb due to their normally small size.

Full plus log backup (Legacy and VSS)

A full plus transaction log backup 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 log backups allows the backup window and network traffic to be minimized. For example, you can perform full backups on the weekend and log 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 log backups, must be restored. It is also possible to do a point-in-time restore to restore a transaction log to a specified date and time.

You can apply Legacy log backups after a full VSS Backup has been restored. In order to do this, you must leave the database in a recovering state by specifying /recovery=no on the command-line interface or by making sure that the Recovery option in the GUI Restore Databases or Restore Groups/Files is not selected when restoring the VSS Backup.

Differential backup (Legacy and VSS)

Perform this type of backup between full backups. A differential database backup can save both time and space — less space in that it consists of only the changed portions of a database since the last full backup (it is cumulative), and less time in that you can avoid applying all individual log backups within that time to the operation. This applies to restore operations as well; only the last differential backup (latest version) need be restored.

You can apply Legacy differential backups after a full VSS Backup has been restored. In order to do this, you must leave the database in a recovering state by specifying /recovery=no on the command-line interface or by making sure that the Recovery option in the GUI Restore Databases or Restore Groups/Files is not selected when restoring the VSS Backup.

Full plus differential plus log backup (Legacy and VSS)

This strategy allows for a faster restore scenario by reducing the number of transactions that may need to be restored and applied. If, for example, a full Legacy or VSS backup is done weekly, a differential nightly, and a log backup every four hours, the restore would involve the full backup, a differential, and at most five log backups. However, simply a full plus log backup scheme on the same cycle could require a full plus up to forty-one
log backups to be restored (six days times six log backups per day plus up to five backups on the day the full backup was done). Although VSS supports full backups only, Legacy log backups and Legacy differential backups can be applied to the VSS full backup.

**File or group backups (Legacy only)**

Use a file backup strategy when it is impractical to backup an entire database due to its size and accompanying time and performance issues. Note that when performing restore operations for a file or file group, it is necessary to provide a separate backup of the transaction log.

File or group options can also save both backup and restore time in cases when certain tables or indexes have more updates than others and need to be backed up more often. It is time-effective to place such data in their own file group or files and then back up only those items.

Consult your Microsoft SQL Server documentation for more details on SQL Server backup strategy and planning.

**Strategies defined by other considerations**

Some commonly used strategies (based upon various considerations) are described as follows:

**Saving time:**

- If a SQL Server volume fails, restoring only the files that are on that volume can save restore time.
- Using multiple data stripes can speed up both backup and restore time. If backing up directly to sequential storage media such as tape pool, use as many stripes as there are tape drives that can be allocated to the SQL backup; otherwise, the separate sessions will queue up waiting for a tape. Striping is available with Legacy operations only.
- Using data compression will reduce network traffic and storage requirements. However, whether it increases or decreases total backup time depends on several factors including the speed of the processors doing the compression and available network bandwidth. For fast networks, compression can increase the backup and restore times.

**Data striping (Legacy only):**

- If you use data striping, also use Tivoli Storage Manager server file space collocation to try to keep each stripe on a different storage volume. Use the Tivoli Storage Manager command `update stgpool` to set this parameter. It is recommended that metadata (counted as a separate file space) not be allowed to go to tape media.
- The maximum number of data stripes you can use must be smaller than the maximum supported by the SQL Server and less than the value of the Tivoli Storage Manager server `txngroupmax` option in the dsmserv.opt file.

**Clustering:**

If you use Microsoft Cluster Server or Veritas Cluster Server clustering for fail-over support, you must install Data Protection for SQL on each cluster node and configure it identically. Additional setup is required to complete the fail-over installation. You must identify a clustered SQL Server by its virtual server name and use that name in Data Protection for SQL to access that SQL Server.
Truncate log on checkpoint option:
When you choose to perform only full backups in SQL, you can also indicate that you want to truncate the log after checkpoints. This will prevent the log from growing without bounds.

Truncate log option:
When you choose to perform a transaction log backup, you can indicate that you do not want to truncate the log. In general, you do not want to truncate the log when rebuilding a corrupt database. This option enables the server to back up the transaction log but does not try to touch the data in any way. It writes all transaction log entries from the time of the last log backup to the point of database corruption.

Collocation:
If you use the full plus log backup strategy, you must decide whether to modify Tivoli Storage Manager storage management policies to ensure that all log 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 log backups. Consult your Tivoli Storage Manager administrator for details on collocation.

Multiple SQL Servers:
If multiple instances of SQL Server are running, the additional instances are identified by name. You must use that name in Data Protection for SQL to access that SQL Server.

Various Recommendations:
• VSS Backups cannot be restored to an alternate SQL Server. This is a Microsoft SQL Server limitation.
• You must use the maxnummp parameter on a Tivoli Storage Manager register node or update node command to allow a node to use multiple sessions to store data on removable media (which requires multiple mount points to be allocated to that node).
• Set backups are intended for special circumstances. If you plan to back up a set of file groups and files regularly, back up each separately in order to use version limits within the management class.
• You cannot back up the tempdb database. It is a temporary database that is re-created each time the SQL Server is started.
• SQL databases with the truncate log on checkpoint option (master or msdb) or that use the Simple recovery model do not have transaction logs that can be backed up.
• Regardless of the frequency of database backups, it is highly recommended that you always run dbcc checkdb and dbcc checkcatalog on a database just before backing it up to check the logical and physical consistency of the database. See your SQL Server documentation for more information on using the SQL Server database consistency checker.
• Data Protection for SQL provides backup and restore functions for SQL databases and associated transaction logs. However, Data Protection for SQL does not provide a complete disaster recovery solution for a SQL Server by itself. There are many other files that are part of the SQL Server installation. These files would need to be recovered in a disaster recovery situation. Examples of these files are executable and configuration files. A comprehensive disaster recovery plan can be obtained by using the normal Tivoli Storage Manager backup-archive client for Windows, together with Data Protection for SQL.
How Tivoli Storage Manager server policy affects Data Protection for SQL

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

The Tivoli Storage Manager server recognizes Data Protection for SQL as a node. Data that is backed up to Tivoli Storage Manager storage from this Data Protection for SQL 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 back up to Tivoli Storage Manager server storage) is deleted after the backup completes, a VSS snapshot (created for back up 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 specified by the Tivoli Storage Manager server \texttt{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 \texttt{verexists} parameter. For example, if \texttt{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 \texttt{verexists} parameter, these sets are ignored by the Tivoli Storage Manager server.

LUNs can also be reused for new backups (depending upon policy management settings) because a failed backup results in one less available backup version. For example, when \texttt{verexists}=3 and three backups have successfully completed, LUNs are reused from the oldest backup to accommodate a fourth backup operation. If the backup fails, it is possible to have only two backup versions because the oldest version was deleted to make room for the new backup.

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.

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 SQL 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.

**Policy considerations for VSS Backups**

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.

**Using VSS and Legacy Backups together**

Using VSS Backups and Legacy Backups together can implement a highly-effective
backup solution for Data Protection for SQL data.

Microsoft supports and recommends using both methods of backup in your
complete backup strategy. Although VSS only supports full backups, Legacy
differential and Legacy log backups can be applied after a full VSS Backup has
been restored.

Also, be aware of the following best practice:
- 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.

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 meta data files for Data Protection for SQL.

**Example strategy of using VSS and Legacy Backups together**

*Table 4. Backup strategy characteristics*

<table>
<thead>
<tr>
<th>Strategy characteristics</th>
<th>Legacy backup only</th>
<th>Legacy backup plus VSS backup</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Available backup types:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FULL 1+ per week</td>
<td>Legacy FULL 1+ per week</td>
<td></td>
</tr>
<tr>
<td>DIFF 1+ per day</td>
<td>VSS FULL 1+ per day</td>
<td></td>
</tr>
<tr>
<td>LOG 1+ per day</td>
<td>Legacy DIFF 1+ per day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Legacy LOG 1+ per day</td>
<td></td>
</tr>
<tr>
<td><strong>Available restore types:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restore to production SQL Server or alternate SQL server</td>
<td>VSS:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• VSS Restore¹</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• VSS Fast Restore²</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• VSS Instant Restore³</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Legacy:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Restore to the production SQL Server or alternate SQL server</td>
<td></td>
</tr>
<tr>
<td><strong>Restore attributes:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FULL, LOG, DIFF, GROUP, FILE</td>
<td>VSS:</td>
<td></td>
</tr>
<tr>
<td>Server, database, file group, and individual file-level restore granularity</td>
<td>• FULL</td>
<td></td>
</tr>
<tr>
<td>Point-in-time recovery</td>
<td>• Database level restore granularity</td>
<td></td>
</tr>
<tr>
<td>Roll-forward recovery</td>
<td>• Point-in-time recovery⁴</td>
<td></td>
</tr>
<tr>
<td>Restore to alternate machine</td>
<td>• Roll-forward recovery⁴</td>
<td></td>
</tr>
</tbody>
</table>

¹ Files are copied from the Tivoli Storage Manager server directly to the production source volumes.
² Files are copied from local shadow volumes directly to the production source volumes.
³ Snapshot volumes are copied to the production source volumes. SAN Volume Controller, DS6000, DS8000, or XIV Gen 2 is required to perform this type of restore.
⁴ In order to acquire these restore attributes, these backups must be Legacy log backups or Legacy differential backups that are applied to a full VSS Backup.
Using VSS operations in a cluster

Data Protection for SQL supports VSS operations in a clustered SQL Server environment.

These requirements and limitations must be understood in order for Data Protection for SQL to successfully perform VSS operations in a clustered SQL Server environment.

VSS cluster requirements

The following requirements must be met for VSS operations to perform successfully in a 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 meta data files for Data Protection for SQL.

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 SQL 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
```

- When registering nodes to the Tivoli Storage Manager server specifically for VSS operations, do not specify the Tivoli Storage Manager `userid=NONE` parameter. VSS operations will fail when this parameter is specified.

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

  ```
  CLUSTERNODE NO
  CLUSTERDISKSONLY NO
  ```

VSS cluster limitations

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

- 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 Gen 2 or SAN Volume Controller with space-efficient target volumes.

- All servers within the cluster must use the same levels of Tivoli Storage Manager, Windows, and other applicable software.

- Microsoft KB919117 is required to perform VSS Instant Restore in a cluster environment on Windows Server 2003 or later.

- Dynamic disks are not supported for VSS Instant Restore operations.
VSS Backups that reside on local VSS shadow volumes can only be restored to the physical node that created the VSS Backup. For example, if NODE_A of a cluster created a VSS Backup and stored it on local shadow volumes, NODE_B of the cluster cannot restore that particular VSS Backup. NODE_B can only restore VSS Backups stored on the Tivoli Storage Manager server or VSS Backups stored on local shadow volumes that were created by NODE_B. This is due to a limitation related to VSS cluster support and not to Tivoli Storage Manager.

VSS Backups that reside on local VSS shadow volumes may be deleted in the event of a cluster failover. This means that if NODE_A of a cluster created a local VSS Backup and afterward, the SQL Server fails over to NODE_B, if a Data Protection for SQL VSS operation is performed on NODE_B of the cluster, the local VSS Backup created by NODE_A will be deleted. This is caused by the fact that the Microsoft VSS architecture is not cluster aware.

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.

A Data Protection for SQL configuration file should be configured for each node in the cluster. These files are almost identical, except that the localsmagentnode parameter points to the corresponding local DSMAgent on each node.

**VSS cluster limitations for scheduled operations**

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 all 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.

**Using Data Protection for SQL in a Microsoft Cluster Server environment**

Data Protection for SQL supports SQL Server running in a MSCS environment.

The list below provides information to consider when running Data Protection for SQL in a Microsoft Cluster Server Environment.

- References to the SQL Server made in this section pertain to the virtual SQL Server name in an MSCS environment.
- You must install Data Protection for SQL on all nodes of the cluster. In addition, when installing Data Protection for SQL, you must install it on a disk local to each node (not on a shared cluster disk).
• You must specify `clusternode yes` in the Data Protection for SQL options file.

• Use identical configurations in the Data Protection for SQL options file when configuring Data Protection for SQL on each node of the cluster.

• If you are using the Tivoli Storage Manager scheduler for automating backups, you must install the scheduler service on each node of the cluster to enable fail-over support. See Chapter 6, “Using the Tivoli Storage Manager scheduler,” on page 189 for more information.

• The Tivoli Storage Manager treats backups as coming from a single server (the virtual server) regardless of which node of the cluster a backup was performed on.

• Multiple snapshots on SAN Volume Controller 5.1 space-efficient VDisks are not supported for single-copy cluster (SCC) environments. These SCC environments include MSCS and VCS environments. Multiple snapshots are not supported because VSS snapshots are not automatically identified as "cluster aware".

When accessing the MSCS from the GUI, note the following:

• You must start the GUI with the `/sqlserver` parameter. For example, if the SQL Server name on your MSCS is "sqlvs2", the GUI invocation is:

  `tdpsql /sqlserver=sqlvs2`

• If you install Data Protection for SQL prior to converting to a Microsoft Cluster Server environment, you need to modify the Start menu shortcut for the Data Protection for SQL GUI program. You can do this by adding the `/sqlserver` parameter to the invocation of `tdpsql`. For example, if you installed Data Protection for SQL to the default location and your virtual SQL Server name is `sqlvs2`, you would modify the shortcut to be:

  "C:\Program Files\Tivoli\TSMTDPSql\tdpsql.exe /sqlserver=sqlvs2"

If you have an ACTIVE/ACTIVE SQL Server cluster environment, you should create a Start menu shortcut for each virtual SQL Server that can run on this machine.

**Using Data Protection for SQL in a Veritas Cluster Server environment**

Data Protection for SQL supports SQL Server running in a VCS environment.

The list below provides information to consider when running Data Protection for SQL in a Veritas Cluster Server Environment.

• References to the SQL Server made in this section pertain to the virtual SQL Server name in an VCS environment.

• You must install Data Protection for SQL on all nodes of the cluster. In addition, when installing Data Protection for SQL, you must install it on a disk local to each node (not on a shared cluster disk).

• You must specify `clusternode yes` in the Data Protection for SQL options file.

• Use identical configurations in the Data Protection for SQL options file when configuring Data Protection for SQL on each node of the cluster.

• If you are using the Tivoli Storage Manager scheduler for automating backups, you must install the scheduler service on each node of the cluster to enable fail-over support. See Chapter 6, “Using the Tivoli Storage Manager scheduler,” on page 189 for more information.

• The Tivoli Storage Manager treats backups as coming from a single server (the virtual server) regardless of which node of the cluster a backup was performed on.
When accessing the VCS from the GUI, note the following:

- You must invoke the GUI with the `/sqlserver` parameter. For example, if the SQL Server name in your VCS is "sqlvcs2", the GUI invocation is:
  ```
tdpsql /sqlserver=sqlvcs2
  ```

- If you install Data Protection for SQL prior to converting to a VCS environment, you need to modify the Start menu shortcut for the Data Protection for SQL GUI program. You can do this by adding the `/sqlserver` parameter to the invocation of `tdpsql`. For example, if you installed Data Protection for SQL to the default location and your virtual SQL Server name is `sqlvcs2`, you would modify the shortcut to be:
  ```
  "C:\Program Files\Tivoli\TSM\TDPSql\tdpsql.exe /sqlserver=sqlvcs2"
  ```

If you have an ACTIVE/ACTIVE SQL Server cluster environment, you should create a Start menu shortcut for each virtual SQL Server that can run on this machine.

### Restore methods

Data Protection for SQL provides several methods of restoring SQL Server data.

#### Legacy Restore

A Data Protection for SQL Legacy Restore obtains backup copies of all or part of one or more SQL databases and returns them to the SQL Server.

A complete restore of a database involves restoring a full backup or the equivalent thereof (from group, file, or set backups) and restoring all transaction logs since the last full backup.

For a Legacy Restore, Data Protection for SQL:

1. Starts a session with a Tivoli Storage Manager server using the Tivoli Storage Manager API and information contained in a client options file.
2. Starts a session with the SQL Server using the SQL-SMO interface.
3. Queries the Tivoli Storage Manager server for a list of database backups.
4. Instructs the SQL Server using the SQL VDI interface to begin a restore of the selected database objects.
5. Receives data from the Tivoli Storage Manager server and forwards it to the SQL Server.
6. Ends the Tivoli Storage Manager and SQL Server sessions.

#### VSS Restore

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

The following characteristics are true of VSS Restores:

- You can only restore SQL Server VSS Backups to the same SQL Server instance.
- Only full backup types can be restored. Differential, individual file groups, individual files, and set backups are not supported by VSS and therefore, cannot be restored. However, Legacy differential and Legacy log backups can be applied after a full VSS Backup has been restored.
- Restore granularity is at the database level.
- Supports restoring one (or more) databases from a VSS snapshot backup located on Tivoli Storage Manager server storage.
- Supports restoring VSS Backups to an alternate location using the /relocatedir option.
- Restores can be performed in a Microsoft Cluster Server (MSCS) or Veritas Cluster server (VCS) environment.

**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 backup types only can be restored. Differential, individual file groups, individual files, and set backups are not supported by VSS and therefore, cannot be restored. However, Legacy differential and Legacy log backups can be applied after a full VSS Backup has been restored.
- You can only restore SQL Server VSS Backups to the same SQL Server instance.
- Restore granularity is at the database level.

**VSS Instant Restore**

A VSS Instant Restore is 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.

Be aware that a VSS Instant Restore is only possible when all of the data (from the database specified for restore) resides on storage subsystems supported by the VSS Instant Restore. If part of the data being restored (including the log files and full-text index files, if present) resides on a local disk, a VSS Instant Restore of this data is not supported. In this situation, a VSS Fast Restore is performed. In addition, you must make sure that any previous background copies (that involve the volumes being restored) are completed prior to initiating the VSS Instant Restore.

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

You can only restore SQL Server VSS Backups to the same SQL Server instance. Although VSS only supports full backups, Legacy differential and Legacy log backups can be applied after a full VSS Backup has been restored.

Be aware of the following considerations when planning for VSS Instant Restore:

- Requires IBM System Storage Support for Microsoft Volume Shadow Copy Service software.
• Backups must reside on the same DS6000, DS8000, SAN Volume Controller, or XIV Gen 2 storage subsystem to which they are restored.
• Do not use version 2.2.2 of the IBM XIV VSS Hardware Provider with Tivoli Storage Manager. There are defects in that specific version that prevent VSS Instant Restore from working properly.

### Restore types

Data Protection for SQL offers an expanded range of restore types that allows flexibility for your environment and processing needs.

Data Protection for SQL provides the same range of object types for restore as for backup.

**Full database restore (Legacy and VSS)**
- The full database backup objects for the specified SQL databases are restored.

**Differential restore (Legacy only)**
- Only the differential database backup objects for specified SQL databases are restored. Restore time is reduced as only the latest differential backup is restored (after its associated full backup is restored).

**Log restore (Legacy only)**
- Log backup objects for the specified SQL databases are restored.

**File restore (Legacy only)**
- Only the file backup objects needed from a full backup, file group backup, a file backup, or a set backup for the specified SQL databases are restored.

**Group restore (Legacy only)**
- Only the group backup objects needed from a full backup, file group backup, a file backup, or a set backup for the specified SQL databases are restored.

**Set restore (Legacy only)**
- Only set backup objects for the specified SQL databases are restored.

Depending on the backup strategy you choose, restoring a SQL database might involve restoring multiple backup objects from the Tivoli Storage Manager server. See “Backup strategies” on page 16.

### Relocating files and other restores

In support of current SQL Server restore capabilities, Data Protection for SQL also provides the ability to relocate files during restore and to perform point-in-time restores, named-marks restores, partial restores, or:

**relocate**
- Allows you to move individual database files to a new location without having to first create the files.

**point-in-time**
- Allows you to restore a transaction log backup to a specific SQL transaction date and time.

**named-marks**
- Allows you to restore a transaction log backup to or before a named point, possibly after a specified point in time, and recover multiple related databases to the same named mark.
**partial** Allows you to restore just enough of a database into a temporary location to copy a specific table to the active database.

**relocate dir**
Allows you to move backed up SQL databases, logs, and SQL Server full-text index files to an alternate location.

Further Data Protection for SQL restore functions include the following:

- Restore a backup using the same number of data stripes used to create the backup, or fewer stripes.
- Restore with no recovery until the last restore with recovery.
- Restore from any available backup version created by Data Protection for SQL Version 5.3.3, Version 5.2.1, Version 5.1.5, or Version 2.2.
- Replace an existing database with the restored database (or replace by relocating the restored database).
- Legacy restore to a different SQL Server or to a standby SQL Server.
- Automatically restore all backup objects needed to make a restore complete by using *smart selection* in the GUI.

**Examples**

See [“Legacy Restore output examples” on page 152](#) for samples of various restore types using the command line interface.

### Security

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

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

Three options are provided when specifying SQL Server logon information:

- Accept the default *sa* account and blank password.
- Use SQL user ID security and specify both the SQL user name and password. With SQL user ID security, the SQL Server administrator provides the logon ID and the password that provides access to the SQL Server.
- Use a trusted connection and let Windows authenticate the logon.

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

Data Protection for SQL provides certain parameters that can be tuned for optimum performance.

Many factors can affect the backup and restore performance of Data Protection for SQL, such as hardware configuration, network type, and capacity. These factors are not within the scope of this document. However, some parameters that are related to Data Protection for SQL can be tuned for optimum performance.

Note: Legacy backups are a stream of bytes that Data Protection for SQL stores on the Tivoli Storage Manager server. VSS Backups differ since they are at the volume and file-level. In a situation where a SQL Server database is not fully allocated, a Legacy backup might transfer a smaller amount of data for a Tivoli Storage Manager backup than for a VSS Backup since a VSS Backup transfers the entire file, regardless of its allocation.

Buffering: (Legacy only)

Data Protection for SQL is a multi-threaded application that uses asynchronous execution threads to transfer data between the SQL 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 can be reading data from a SQL Server while another is sending data to the Tivoli Storage Manager server. The number of buffers that Data Protection for SQL allocates to these threads can be specified in the \buffers and /sqlbuffers parameters of the command line interface. The size of these buffers can be specified in the \buffersize and /sqlbuffersize parameters.

Data Striping: (Legacy only)

In addition to multi-threading to maximize throughput on a single session, Data Protection for SQL uses separate threads to support SQL data striping, which allows use of multiple parallel sessions to backup and restore a single database. This is another method to maximize data throughput. If a single session cannot fully exploit available bandwidth, multiple parallel sessions can yield improved data throughput, especially if the database is spread across multiple physical volumes.

If you use one data stripe per physical volume for both the SQL Server and the Tivoli Storage Manager server, the performance (measured as the amount of time necessary to backup or restore a particular SQL database) should show an improvement over the unstriped case (approximately proportional to the number of data stripes used, given the constraints of the devices and the network used, and striping independent overhead in SQL Server, Tivoli Storage Manager server, and Data Protection for SQL).

Note:

1. Additional striping does not necessarily improve performance and may even decrease performance if system constraints involving real and paged memory, processors, network interface cards, networks, device reads and writes, and RAID become saturated or exceed capacity.
2. If you use striping in conjunction with SQL buffers, be certain that the number of SQL buffers specified is equal to or greater than the number of stripes.
3. The default values that Data Protection for SQL assigns to buffers, bufffersize, and stripes can be changed in the Data Protection for SQL configuration file. Use the set command or the Edit menu of the GUI to modify the configuration file.

LAN Free: (Legacy and VSS)

Running Data Protection for SQL in a LAN free environment if you are equipped to do so avoids network constraints.

- For Legacy backups, specify `enablelanfree yes` in the Data Protection for SQL options file.
- For VSS Backups, specify `enablelanfree yes` in the DSMAGENT (VSS Requestor) dsm.opt file only.

For information on setting up a LAN free environment, refer to the Tivoli publication *IBM Tivoli Storage Manager for SAN for Windows Storage Agent User’s Guide.*
Chapter 2. Installing

This section provides information on Data Protection for SQL requirements and discusses some of the choices you will need to make during installation.

Data Protection for SQL 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.

---

**Software and operating system requirements**

Data Protection for SQL requires the following levels of Tivoli Storage Manager software:
- Tivoli Storage Manager backup-archive client Version 5.5.0 (or later).
- Tivoli Storage Manager API Version 5.5.0 (or later).
- Tivoli Storage Manager server Version 5.4.0 (or later)

Details of the software and operating system requirements for Data Protection for SQL can change over time. For the most up-to-date requirements, please visit the Hardware and Software Requirements Web page at [http://www.ibm.com/support/docview.wss?uid=swg21430687](http://www.ibm.com/support/docview.wss?uid=swg21430687).

**Legacy Backup and Restore software and operating system requirements**

Table 5. Minimum software and operating system requirements for Legacy Backup and Restore operations

<table>
<thead>
<tr>
<th>Operating System</th>
<th>SQL Server</th>
<th>VSS Provider</th>
<th>Tivoli Storage Manager for Copy Services or Tivoli Storage FlashCopy Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Windows Server 2003 x86</td>
<td>SQL Server 2000, SQL Server 2005, SQL Server 2008 R2</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Microsoft Windows Server 2003 x64</td>
<td>SQL Server 2005, SQL Server 2008 R2</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Microsoft Windows Server 2003 ia64</td>
<td>SQL Server 2000, SQL Server 2005, SQL Server 2008 R2</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Microsoft Windows Server 2003 R2</td>
<td>SQL Server 2000, SQL Server 2005, SQL Server 2008 R2</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

---

© Copyright IBM Corp. 1997, 2010
### Table 5. Minimum software and operating system requirements for Legacy Backup and Restore operations (continued)

<table>
<thead>
<tr>
<th>Operating System</th>
<th>SQL Server</th>
<th>VSS Provider</th>
<th>Tivoli Storage Manager for Copy Services or Tivoli Storage FlashCopy Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Windows Server 2008</td>
<td>SQL Server 2000, SQL Server 2005, SQL Server 2008 R2</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Microsoft Windows Server 2008 R2</td>
<td>SQL Server 2000, SQL Server 2005, SQL Server 2008 R2</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

### Basic VSS software and operating system requirements

### Table 6. Minimum software and operating system requirements for basic VSS operations

<table>
<thead>
<tr>
<th>Operating System</th>
<th>SQL Server</th>
<th>VSS Provider</th>
<th>Tivoli Storage Manager for Copy Services or Tivoli Storage FlashCopy Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Windows Server 2003 x86</td>
<td>SQL Server 2005, SQL Server 2008 R2</td>
<td>Any VSS provider that is supported by Microsoft rules for VSS providers.</td>
<td>Microsoft SQL VSS Integration Module Version 5.5.0 or Tivoli Storage FlashCopy Manager 2.1 (or later)</td>
</tr>
<tr>
<td>Microsoft Windows Server 2003 x64</td>
<td>SQL Server 2005, SQL Server 2008 R2</td>
<td>Any VSS provider that is supported by Microsoft rules for VSS providers.</td>
<td>Microsoft SQL VSS Integration Module Version 5.5.0 or Tivoli Storage FlashCopy Manager 2.1 (or later)</td>
</tr>
<tr>
<td>Microsoft Windows Server 2003 R2</td>
<td>SQL Server 2005, SQL Server 2008 R2</td>
<td>Any VSS provider that is supported by Microsoft rules for VSS providers.</td>
<td>Microsoft SQL VSS Integration Module Version 5.5.0 or Tivoli Storage FlashCopy Manager 2.1 (or later)</td>
</tr>
<tr>
<td>Microsoft Windows Server 2008</td>
<td>SQL Server 2008 R2</td>
<td>Any VSS provider that is supported by Microsoft rules for VSS providers.</td>
<td>Microsoft SQL VSS Integration Module Version 5.5.0 or Tivoli Storage FlashCopy Manager 2.1 (or later)</td>
</tr>
<tr>
<td>Microsoft Windows Server 2008 R2</td>
<td>SQL Server 2008 R2</td>
<td>Any VSS provider that is supported by Microsoft rules for VSS providers.</td>
<td>Microsoft SQL VSS Integration Module Version 5.5.0 or Tivoli Storage FlashCopy Manager 2.1 (or later)</td>
</tr>
</tbody>
</table>
### VSS Off-loaded Backup software and operating system requirements

**Table 7. Minimum software and operating system requirements for VSS Off-loaded Backup**

<table>
<thead>
<tr>
<th>Operating System</th>
<th>SQL Server</th>
<th>VSS Provider</th>
<th>Tivoli Storage Manager for Copy Services or Tivoli Storage FlashCopy Manager</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microsoft Windows Server 2003 x86</td>
<td>SQL Server 2005(^5), SQL Server 2008(^6), or SQL Server 2008 R2</td>
<td>Any VSS provider that supports transportable shadow copies.(^6)</td>
<td>Microsoft SQL VSS Integration Module Version 5.5.0 (or later)(^7) or Tivoli Storage FlashCopy Manager 2.1 (or later)</td>
</tr>
<tr>
<td>Microsoft Windows Server 2003 x64</td>
<td>SQL Server 2005(^5), SQL Server 2008(^6), or SQL Server 2008 R2</td>
<td>Any VSS provider that supports transportable shadow copies.(^6)</td>
<td>Microsoft SQL VSS Integration Module Version 5.5.0 (or later)(^7) or Tivoli Storage FlashCopy Manager 2.1 (or later)</td>
</tr>
<tr>
<td>Microsoft Windows Server 2003 R2</td>
<td>SQL Server 2005(^5), SQL Server 2008(^6), or SQL Server 2008 R2</td>
<td>Any VSS provider that supports transportable shadow copies.(^6)</td>
<td>Microsoft SQL VSS Integration Module Version 5.5.0 (or later)(^7) or Tivoli Storage FlashCopy Manager 2.1 (or later)</td>
</tr>
<tr>
<td>Microsoft Windows Server 2008</td>
<td>SQL Server 2005(^5), SQL Server 2008(^6), or SQL Server 2008 R2</td>
<td>Any VSS provider that supports transportable shadow copies.(^6)</td>
<td>Microsoft SQL VSS Integration Module Version 5.5.0 (or later)(^7) or Tivoli Storage FlashCopy Manager 2.1 (or later)</td>
</tr>
<tr>
<td>Microsoft Windows Server 2008 R2</td>
<td>SQL Server 2005(^5), SQL Server 2008(^6), or SQL Server 2008 R2</td>
<td>Any VSS provider that supports transportable shadow copies.(^6)</td>
<td>Microsoft SQL VSS Integration Module Version 5.5.0 (or later)(^7) or Tivoli Storage FlashCopy Manager 2.1 (or later)</td>
</tr>
</tbody>
</table>
VSS Instant Restore software and operating system requirements

Table 8. Minimum software and operating system requirements for VSS Instant Restore

<table>
<thead>
<tr>
<th>Operating System</th>
<th>SQL Server</th>
<th>VSS Provider</th>
<th>Tivoli Storage Manager for Copy Services or Tivoli Storage FlashCopy Manager</th>
</tr>
</thead>
</table>
| Microsoft Windows Server 2003 x86<sup>1</sup> | SQL Server 2005<sup>5</sup>, SQL Server 2008<sup>10</sup>, or SQL Server 2008 R2 | See the IBM System Storage Web site for the specific requirements for your level of DS or SAN Volume Controller storage subsystem.<sup>8</sup> | On DS storage subsystems: Tivoli Storage FlashCopy Manager 2.1 (or later) or
  • Microsoft SQL VSS Integration Module Version 5.5.0 (or later)<sup>7</sup>
  • Hardware Devices Snapshot Integration Module Version 5.5.0 (or later)<sup>9</sup> |
| Microsoft Windows Server 2003 x64<sup>2</sup> | | | |
| Microsoft Windows Server 2003 R2 | | | On SAN Volume Controller storage subsystems: or Tivoli Storage FlashCopy Manager 2.1 (or later) or
  • Microsoft SQL VSS Integration Module Version 5.5.0 (or later)<sup>7</sup>
  • Hardware Devices Snapshot Integration Module Version 5.5.0 (or later)<sup>9</sup> |
| Microsoft Windows Server 2008 | | | |
| Microsoft Windows Server 2008 R2 | | | |

---

1. **Windows Server 2003 x86**: Standard, Enterprise, or DataCenter Edition. All versions must be at Service Pack 2 (or later). **Windows Server 2003 R2**: Standard, Enterprise, or DataCenter Edition. All versions must be at Service Pack 2 (or later). Note that Microsoft Virtual Server 2005 is also supported.

2. **Windows Server 2003 x64** Standard, Enterprise, or DataCenter x64 Edition. All versions must be at Service Pack 2 (or later). **Windows Server 2003 x64 R2**: Standard, Enterprise, or DataCenter x64 Edition. All versions must be at Service Pack 2 (or later).

3. **Windows Server 2003 ia64** Standard, Enterprise, or DataCenter ia64 Edition. All versions must be at Service Pack 2 (or later).

4. SQL Server 2000 must be at Service Pack 4 (or later). In addition, the following software is also required when using SQL Server 2000 with Data Protection for SQL 5.5.0:
  • Microsoft .NET Framework version 2.0 (or later)
  • Microsoft Core XML Services (MSXML) 6.0 (or later)
  • Microsoft SQL Server Native Client
  • Microsoft SQL Server 2005 Management Objects Collection

Data Protection for SQL cannot back up or restore SQL 6.0 or 6.5 level databases or relocate full-text index files.
SQL Server 2005 Standard or Enterprise Edition must be at Service Pack 3 (or later).

The VSS hardware provider must be installed on both machines that are involved in an Off-loaded backup.

The Microsoft SQL VSS Integration Module is dependent upon the base Data Protection for SQL product and must be installed to perform any VSS operations. The Tivoli Storage Manager backup-archive client Version 5.5.0 (or later) is also required.

The IBM System Storage Web site is available at the following URL:
http://www-1.ibm.com/support/docview.wss?rs=591&uid=ssg1S1003090#_Windows

The Hardware Devices Snapshot Integration Module is dependent upon the base Tivoli Storage Manager backup-archive client product and must be installed to perform VSS Instant Restore operations.

SQL Server 2008 must be at Service Pack 1 (or later).

When running VSS operations using VSS Hardware Providers, make sure the following hot fixes are applied:
- Windows 2003: KB972623
- Windows 2008: KB975831
- Windows 2008 R2: KB977096

### Hardware requirements

#### Legacy Backup and Restore hardware requirements

Table 9. Minimum hardware requirements for Legacy Backup and Restore operations

<table>
<thead>
<tr>
<th>Architecture</th>
<th>Hardware Description</th>
<th>Disk Space</th>
<th>RAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>32-bit</td>
<td>One Intel Pentium or equivalent 166 (or later) processor.</td>
<td>20 MB</td>
<td>48 MB (96 MB or greater recommended)</td>
</tr>
</tbody>
</table>
| x64          | One of the following:  
  - Processor that supports Intel Extended Memory 64 Technology (Intel EM64T)  
  - AMD 64-bit processor that supports AMD64 platform | 20 MB      | 48 MB (96 MB or greater recommended) |
| IA64         | One Intel Itanium 64-bit chipset, or equivalent (or later) processor. | 20 MB      | 48 MB (96 MB or greater recommended) |

#### VSS Backup and Restore hardware requirements

Table 10. Minimum hardware requirements for VSS Backup and Restore operations

<table>
<thead>
<tr>
<th>Architecture</th>
<th>Hardware Description</th>
<th>Disk Space</th>
<th>RAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>32-bit</td>
<td>One Intel Pentium or equivalent 166 (or later) processor.</td>
<td>20 MB</td>
<td>48 MB (96 MB or greater recommended)</td>
</tr>
</tbody>
</table>
Table 10. Minimum hardware requirements for VSS Backup and Restore operations (continued)

<table>
<thead>
<tr>
<th>Architecture</th>
<th>Hardware Description</th>
<th>Disk Space</th>
<th>RAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>x64</td>
<td>One of the following:</td>
<td>20 MB</td>
<td>48 MB (96 MB or greater recommended)</td>
</tr>
<tr>
<td></td>
<td>• Processor that supports Intel Extended Memory 64 Technology (Intel EM64T)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• AMD 64-bit processor that supports AMD64 platform</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

VSS offloaded backup hardware requirements1

Table 11. Minimum hardware requirements for VSS offloaded backup operations

<table>
<thead>
<tr>
<th>Architecture</th>
<th>Hardware Description</th>
<th>Disk Space</th>
<th>RAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>32-bit or x64</td>
<td>A storage subsystem with a VSS hardware provider.2</td>
<td>See Provider documentation</td>
<td>See Provider documentation</td>
</tr>
</tbody>
</table>

VSS Instant Restore hardware requirements1

Table 12. Minimum hardware requirements for VSS Instant Restore operations

<table>
<thead>
<tr>
<th>Architecture</th>
<th>Hardware Description</th>
<th>Disk Space</th>
<th>RAM</th>
</tr>
</thead>
<tbody>
<tr>
<td>32-bit or x64</td>
<td>One of the following:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• IBM System Storage DS6000 disk storage subsystem3</td>
<td>200 megabytes of free disk space on your Windows System Drive. This space is used to hold the meta data files for Data Protection for SQL.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• IBM System Storage DS8000 disk storage subsystem3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• IBM System Storage SAN Volume Controller Version 4.1 (or later) or Version 4.2 (or later)3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• IBM XIV Storage System Model 2810 (Gen 2)4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Data Protection for SQL VSS operations are available on any hardware that supports Microsoft VSS requirements. Refer to your VSS provider documentation for required levels. The following list identifies some hardware storage subsystems that were tested with Data Protection for SQL VSS operations:

- IBM System Storage DS6000 and a machine with a processor supported by DS6000 with IBM Common Interface Model (CIM) Agent for DS Open API.
- IBM System Storage DS8000 and a machine with a processor supported by DS8000 with IBM Common Interface Model (CIM) Agent for DS Open API.
- IBM System Storage N3700 with Network Appliance (NetApp) SnapDrive Version 4.2 (or later).
- NetApp fabric-attached storage (FAS) system with NetApp SnapDrive Version 4.2 (or later).
- IBM System Storage SAN Volume Controller Version 4.1 (or later).
- IBM XIV Storage System Model 2810 (Gen 2)
Contact your hardware storage subsystem vendor for exact details of their support of VSS operations.

2. You must have a hardware storage subsystem that supports transportable shadow copies and delivers a VSS hardware provider for the hardware storage subsystem that adheres to Microsoft VSS Provider API standards.

3. On 32-bit architecture, IBM System Storage DS6000, DS8000, and SAN Volume Controller storage subsystems require that IBM System Storage VSS Hardware Provider Version 2.5.0.x (or later) also be running on the same machine as Data Protection for SQL. On x64 architecture, Version 2.6.0.x (or later) must be running.

4. IBM XIV Storage System Model 2810 (Gen 2) requires that IBM XIV VSS HW Provider Version 2.1.0.x or later also be running on the same machine as Data Protection for Exchange.

For detailed information regarding current hardware product compatibility requirements, see the IBM System Storage Web site: [http://www-03.ibm.com/servers/storage](http://www-03.ibm.com/servers/storage)

---

**Installing on a local system (standard)**

Detailed instructions are provided for installing the Data Protection for SQL base code.

Data Protection for SQL must be installed from an account having administrator privileges to the local system.

Follow these instructions to install Data Protection for SQL. The default installation directory is `c:\Program Files\Tivoli\TSM\TDPSql`. If a Tivoli Storage Manager product exists on your machine, the base path to that product (`c:\Program Files\Tivoli\TSM`) becomes the default installation directory. Installing all Tivoli Storage Manager products and components into the same base directory is highly recommended.

1. Insert the IBM Tivoli Storage Manager for Databases Data Protection for Microsoft SQL Server product CD into the CD drive and select **Run** from the Start menu.

2. Navigate to the appropriate directory (where `x` is your CD drive letter):
   - (32-bit): `x:\TDPSql\x32\client`
   - (x64): `x:\TDPSql\x64\client`
   - (IA64): `x:\TDPSql\ia64\client`

3. Select `setup.exe` and click **OK**. Follow the installation instructions contained in the prompt windows.

4. Click **Finish** to complete the installation.
   - If you plan to use the product in a language other than English, see "Installing the language packs" on page 38 for additional installation tasks.
   - (VSS only): If you plan to perform basic VSS operations, you must also install IBM Tivoli Storage FlashCopy Manager or the Tivoli Storage Manager for Copy Services Microsoft SQL VSS Integration Module.
     To install IBM Tivoli Storage FlashCopy Manager, see the *IBM Tivoli Storage FlashCopy Manager for Windows Installation and User’s Guide*.
     To install Tivoli Storage Manager for Copy Services, perform these tasks:
a. Insert the Tivoli Storage Manager for Copy Services product CD into the CD drive and select **Run** from the Start menu.

b. Navigate to the appropriate directory (where x is your CD drive letter):
   - (32-bit): x:\TDPSQL\x32\plugin
   - (x64): x:\TDPSQL\x64\plugin

c. Select `setup.exe` and click **OK**. Follow the installation instructions contained in the prompt windows.

d. Click **Finish** to complete the installation of the SQL VSS Integration Module. This module installs a license file in the `Program Files\Tivoli\TSM\TDPSql` directory.

- (VSS only): If you plan to perform VSS Instant Restores, you must also install IBM Tivoli Storage FlashCopy Manager or the Tivoli Storage Manager for Copy Services Hardware Devices Snapshot Integration Module (in addition to the Tivoli Storage Manager for Copy Services Microsoft SQL VSS Integration Module):
  a. Insert the Tivoli Storage Manager for Copy Services product CD into the CD drive and select **Run** from the Start menu.
  b. Navigate to the appropriate directory (where x is your CD drive letter):
     - (32-bit): x:\tmscli\x32\plugin
     - (x64): x:\tmscli\x64\plugin
  c. Select `setup.exe` and click **OK**. Follow the installation instructions contained in the prompt windows.
  d. Click **Finish** to complete the installation of the Hardware Devices Snapshot Integration Module. This module installs two .dll files (pihdw.dll, pisnaphdw.dll) and two license files (acshdw.lic, acssnp.lic) in the `Program Files\Tivoli\TSM\baclient\plugins` directory.

When the installation is complete, you must configure Data Protection for SQL:

[Chapter 3, “Configuring Data Protection for SQL,” on page 41](#)

### Installing the language packs

Detailed instructions are provided for installing Data Protection for SQL language packs.

Make sure that the Data Protection for SQL base code has been successfully installed before attempting to install the Language Packs.

To view the Data Protection for SQL GUI, command line output, and messages in a language other than English, install the desired Language Pack. The Language Packs are executable files located in their respective language directory on the product CD.

1. Insert the product CD into the CD drive and select **Run** from the Start menu.
2. Navigate to the appropriate directory (where x is your CD drive letter and aaa represents the three-letter country code associated with that language):
   - (32-bit): x:\TDPSql\x32\languages\aaa
   - (x64): x:\TDPSql\x64\languages\aaa
   - (IA64): x:\TDPSql\ia64\languages\aaa
3. Select `setup.exe` and click **OK**. Follow the installation instructions contained in the prompt windows.
4. Click **Finish** to complete the installation.
After installing the Language Pack, activate the language by updating the Data Protection for SQL configuration file (tdpsql.cfg by default) using either of these methods:

- Use the `set` command with the `language` parameter to specify the desired language. For example:
  
  `tdpsqlc set lang=fra`

  See the description of the `language` parameter in “Set positional parameters” on page 178 for a list of available languages and their three-letter country codes.

- Use the Configuration Editor in the Data Protection for SQL GUI by selecting Edit->Configuration->Regional->Language. The GUI Configuration Editor will show the installed languages in their long form. For example:

  English (United States)

---

**Installing Data Protection for SQL in an MSCS or VCS environment**

Detailed instructions are provided for installing the Data Protection for SQL base code in a cluster environment.

Installing Data Protection for SQL in a MSCS or VCS environment requires the following:

1. Install Data Protection for SQL on both nodes of your MSCS or VCS if you are installing Data Protection for SQL for a clustered SQL Server.

2. If you installed Data Protection for SQL prior to converting to a MSCS or VCS environment, modify the Start menu shortcut for the Data Protection for SQL GUI program. Do this by adding the `/sqlserver` parameter to the invocation of the `tdpsql` command. For example, if you installed Data Protection for SQL to the default location and your virtual SQL Server name is `marssql1`, you would modify the shortcut to:

   "C:\Program Files\Tivoli\TSM\TDPSql\tdpsql.exe /sqlserver=marssql1"

   If you have an Active/Active SQL Server cluster environment, you should create a Start menu shortcut for each virtual SQL Server that can run on this machine.

---

**Installing Data Protection for SQL on a local system (silent)**

Chapter 3. Configuring Data Protection for SQL

This chapter is divided into two major sections:

- **“Part I: Configuration overview” on page 42**
  
  This section provides detailed information about setting Data Protection for SQL and Tivoli Storage Manager options, policies, and preferences. For best results, it is recommended that you read this information carefully before performing any configuration tasks.

- **“Part II: Configuration procedure” on page 59**
  
  This section provides detailed step-by-step instructions on how to configure Data Protection for SQL for both Legacy and VSS Backups.

- **“Part III: Verify your configuration” on page 62**
  
  This section provides instructions on how to verify that Data Protection for SQL is installed and configured properly, including those components required for VSS Backups. Data Protection for SQL should be ready for backup and restore processing upon successful completion of this verification procedure.

What applications must I configure? This table identifies the software applications that must be configured to perform certain features.

*Table 13. List of applications to configure*

<table>
<thead>
<tr>
<th>To use these features:</th>
<th>You must configure these applications:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Legacy backup</td>
<td>• Data Protection for SQL</td>
</tr>
<tr>
<td>• Legacy restore</td>
<td>• Tivoli Storage Manager server</td>
</tr>
<tr>
<td>• VSS Backup</td>
<td>• Data Protection for SQL</td>
</tr>
<tr>
<td>• VSS Restore</td>
<td>• Tivoli Storage Manager server</td>
</tr>
<tr>
<td></td>
<td>• Tivoli Storage Manager backup-archive client local Client Acceptor Daemon (CAD) on the local machine</td>
</tr>
<tr>
<td></td>
<td>• VSS software provider or VSS hardware provider</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>• VSS Backup</td>
<td>• Data Protection for SQL</td>
</tr>
<tr>
<td>• VSS Instant Restore</td>
<td>• Tivoli Storage Manager server</td>
</tr>
<tr>
<td>• VSS Restore</td>
<td>• Tivoli Storage Manager backup-archive client local Client Acceptor Daemon (CAD) on the local machine</td>
</tr>
<tr>
<td>• Off-loaded backup</td>
<td>• Tivoli Storage Manager backup-archive client local Client Acceptor Daemon (CAD) on the machine designated to perform the offloaded backup</td>
</tr>
<tr>
<td></td>
<td>• VSS software provider or VSS hardware provider</td>
</tr>
</tbody>
</table>

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

This section provides guidelines about available options, recommended settings, and other useful information needed to configure Data Protection for SQL. It is recommended that you review this information before performing the configuration tasks described in “Part II: Configuration procedure” on page 59. For an overview of the various VSS components, see “VSS Service overview” on page 12.

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

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

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 SQL 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 corrupt or deleted.

Local shadow volumes

Backups to local shadow volumes are usually dictated by versions because of space limitations and provisioning of VSS storage.

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 SQL 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 and SAN Volume Controller environments

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.

VSS limitations for SAN Volume Controller: When performing a Data Protection for SQL VSS backup (non-offloaded) with backup destination as Tivoli Storage Manager Server, and the SQL Server data resides on SAN Volume Controller (SVC) disks, and the IBM System Storage VSS Hardware Provider is being used, in some isolated cases the SVC 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 SQL VSS backups, back to back, and the SQL Server data resides on SAN Volume Controller (SVC) disks, if the volumes are large and/or the SVC background copy rate is set a low number, it may appear that the second VSS backup is hanging. In fact, it is waiting for the SVC background copy of the first backup to complete before proceeding with the second backup. SVC 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 SVC background copy to complete. You may also see timeouts errors if the previous SVC background copy takes too long. To work around this issue, schedule your VSS backups far enough apart to accommodate this situation. You can also try increasing the copy rate of the SVC background copy.

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:

<table>
<thead>
<tr>
<th>SQL Database size: 100GB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of local backups to be kept: 3</td>
</tr>
<tr>
<td>Snapshot for TSM backup: 1</td>
</tr>
<tr>
<td>duration for TSM backup: 2hr</td>
</tr>
<tr>
<td>Backup frequency: 3hrs</td>
</tr>
<tr>
<td>The duration before a local backup is expired: 9 hrs</td>
</tr>
<tr>
<td>Amount of data changed/added/deleted per hr: 50MB</td>
</tr>
<tr>
<td>Space required for each local backup: 50*9 = 450 MB</td>
</tr>
<tr>
<td>Space required for 3 local backups + 1 TSM backup: 450<em>3 + 50</em>2 = 1450 MB</td>
</tr>
<tr>
<td>The volume size required for the database: 100*2 (space reservation) + 1.5 = 201.5 GB</td>
</tr>
</tbody>
</table>
**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 SQL 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 SQL VSS operations can be fully utilized. However, this situation is not applicable when FlexVols are used.

**SQL 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, please check your setup to ensure that following requirements are met.

- The NAS filers LUNs used by a database must be fully dedicated to the database. The Microsoft SQL Server databases cannot share LUNs.
- A NAS filer LUN used by the SQL databases must be the only LUN on the filer volume. For example, if SQL 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 FlexVols are used.
- 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 SQL 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 utilizing 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-full backups to Tivoli Storage Manager (offloaded backup) 5am
- Perform weekly legacy full backups (or as needed).

How Tivoli Storage Manager server policy affects Data Protection for SQL

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

The Tivoli Storage Manager server recognizes Data Protection for SQL as a node. Data that is backed up to Tivoli Storage Manager storage from this Data Protection for SQL 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 back up to Tivoli Storage Manager server storage) is deleted after the backup completes, a VSS snapshot (created for back up 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 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.

LUNs can also be reused for new backups (depending upon policy management settings) because a failed backup results in one less available backup version. For example, when `verexists`=3 and three backups have successfully completed, LUNs are reused from the oldest backup to accommodate a fourth backup operation. If the backup fails, it is possible to have only two backup versions because the oldest version was deleted to make room for the new backup.

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.

**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 SQL 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.

**Policy considerations for VSS Backups**

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

Policy Set
Policy sets contain management classes (which contain copy groups) that determine the rules by which Data Protection for SQL backups are performed and managed. Define the policy set to the policy domain to which Data Protection for SQL backups belong. Note that the policy set must be activated and only one policy set can be active in the policy domain.

Management Class
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 database (VERExists=6) while maintaining only two versions of the same database on Tivoli Storage Manager server storage (VERExists=2). In addition, you can create a separate management class for full backups for use in long term storage. Such policies can maximize storage resources and provide more control over your storage strategy.

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

Metadata considerations (Legacy only)

The management classes for Data Protection for SQL metadata should be identical to the corresponding management classes for database data except that the metadata management classes should not allow migration to removable media. If any Data Protection for SQL metadata is on removable media, queries may require media mounts, and backups or restores may require additional media mounts.

Data objects and their associated meta objects should have the same version limits and retention values. However, because meta objects may need to be restored as a result of a Data Protection for SQL query, you may want to consider storing meta objects in a disk-only storage pool so that a media mount is not necessary to resolve the query. To do this, you can:

1. Define a separate management class with a Copy Destination pointing to a disk pool that does not have any removable media in its hierarchy.
2. Bind all meta objects to that management class using an include statement in the Data Protection for SQL options file.
Alternatively, you can choose to use the same management class (and storage pools) for both meta and data objects if you rarely need the meta objects, or need them only immediately preceding a restore when a volume mount is required anyway. In many cases, you can also obtain the meta object information from SQL Server as recorded in its msdb database. For further details about binding backup objects to specific management classes, see “Setting automatic expiration (VSS and Legacy)” on page 55.

Copy Group
Define the copy group as a backup copy group and not an archive copy group. Since Data Protection for SQL 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 SQL Server database backup versions to retain for databases that exist on the Data Protection for SQL client system.

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

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

RETOOnly
Determines the number of days to retain the last SQL Server database backup version of a database that has been deleted from the Data Protection for SQL client system. Be aware that log backups do not participate in expirations (due to version limit) because there is never more than one version of a log backup object. This is because log backups are always uniquely named. However, all Legacy backup objects for an SQL Server database are inactivated when a new full backup of that SQL Server database is performed (VSS backup objects remain active).

Because log and set objects are always uniquely named, they do not participate in expirations due to version limit. However, Data Protection for SQL inactivates all backup objects for a SQL database not otherwise inactivated whenever a new full database backup of that SQL database is performed. Therefore, the retention period defined through the RETOnly parameter controls the expiration of log and set backups. There will never be more than one version of a log or set object. In addition, consider these guidelines:

- When selecting the RETOnly value for log backups, ensure that it is at least as long as the value for the backup objects the logs are associated with. You can use the same management class for log backups and the backup objects that are retained the longest to be sure you use an adequate value. However, all Legacy backup objects for an SQL Server database are inactivated when a new Legacy full backup of that SQL Server database is performed (VSS backup objects remain active).
- Set backups are intended to be used in unusual one-of-a-kind situations.
- If you do not wish to wait for the next full database backup, you can explicitly inactivate any particular active object (if it is no longer needed).
or any active objects older than a specified number of days using the
"Inactivate command (Legacy only)" on page 166.

If you exploit data striping, each stripe of a backup must have the same
version limits and retention values to ensure that some parts of a single
logical backup object do not expire before others.

**MODE, SERialization, FREQuency**

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

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 single restore can require a full backup or a differential backup. It is
recommended to use collocation if these backups are stored on removable media.
Specify collocation by file space (define stgpool COLLocate=Filespace) if you plan
to restore multiple databases in parallel. This is recommended because individual
data stripes stay on separate removable volumes. If you use data striping, use
collocation by file space on sequential storage pools to maintain the stripes on
separate storage volumes. This is necessary to allow concurrent parallel access to
each of the stripes. If it happens that multiple stripes for the same object end up
on the same sequential volume (because insufficient empty volumes are available),
the Tivoli Storage Manager server **move data** command can be used to move the
objects to a disk storage pool or to new sequential volumes added to the storage
pool so that they can be accessed in parallel.

A single, complete restore may require a full database backup, a differential
backup, and multiple log backups, or one or more group, file, or set backups and
multiple log backups. It is recommended that you use collocation if these backups
may be stored on removable media.

**Data Protection for SQL node name: Recommended settings**

The machine where Data Protection for SQL 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 SQL 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 SQL 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)"
on page 50 for details about this task.

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

- **BACKDELeTe** This parameter determines whether the Data Protection for SQL
  node can delete its own backup files from the Tivoli Storage Manager server.
  This parameter MUST have a value of yes.

- **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. This must be set to a number greater than the
default value of 1 if you are to exploit SQL data striping with data going directly
to a tape pool. For example, set this value to be at least the maximum number of
stripes to be used for backup or restore when removable media such as tapes are
used or if migration occurs during the backup or restore operation. If other
backups or restores may occur at the same time, the value of this parameter must be large enough to allow for all of the needed mount points.

- **TXNGroupmax** This parameter determines the number of files transferred as a group between Data Protection for SQL and the Tivoli Storage Manager server between transaction commit points. This parameter MUST have a value of at least one more than the maximum number of stripes to be used for backup or restore operations regardless of media.

- **COMPression** (Legacy only) This parameter determines whether the Data Protection for SQL node compresses data before sending it to the Tivoli Storage Manager server during a backup operation. Specify **COMPression=Client** to allow the Data Protection for SQL node to make the decision whether to compress data via the value of the client **COMPression** option specified in the options file (dsm.opt) located in the Data Protection for SQL directory.

**Note:** If you are running Data Protection for SQL on a Microsoft Cluster Server, the node name cannot be the name of the local computer. Instead, the node name should match the SQL 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 SQL 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 SQL 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.

- **Agent node**: A node name that performs operations on behalf of a target node.

These nodes are defined using the backup-archive client **grant proxy** command. For example:

```
GRANT PROXY TARGET=<dpsql node name> AGENT=<dsmagent node name>
```

### Required node names for basic VSS operations

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

**Table 14. Required node names for basic VSS operations**

<table>
<thead>
<tr>
<th>Proxy node type</th>
<th>Nodename</th>
<th>Where to specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target node</td>
<td>Data Protection for SQL node name</td>
<td>Use the <strong>nodename</strong> option in the Data Protection for SQL options file (dsm.opt)</td>
</tr>
<tr>
<td>Agent node</td>
<td>Local DSMAGENT Node</td>
<td>Use the <strong>localdsmagentnode</strong> parameter in the Data Protection for SQL configuration file (tdpsql.cfg)</td>
</tr>
</tbody>
</table>
Target node
This is the node name where Data Protection for SQL is installed. This node name (specified with the nodename option in the dsm.opt file) is referred to as the Data Protection for SQL node name.

Agent node
This is the node name where the backup-archive client is installed. This node is responsible for performing the VSS operations as Data Protection for SQL 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 SQL configuration file (tdpsql.cfg by default). You can use the Configuration task in the Edit Menu of the GUI or the tdpsqlc 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 off-loaded backups
To perform VSS off-loaded backups, you must have one target node and two agent nodes:

Table 15. Required node names for VSS off-loaded backups

<table>
<thead>
<tr>
<th>Proxy node type</th>
<th>Nodename</th>
<th>Where to specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target node</td>
<td>Data Protection for SQL node name</td>
<td>Use the nodename option in the Data Protection for SQL options file (dsm.opt)</td>
</tr>
<tr>
<td>Agent node</td>
<td>Local DSMAGENT Node</td>
<td>Use the localdsmagentnode parameter in the Data Protection for SQL configuration file (tdpsql.cfg)</td>
</tr>
<tr>
<td>Agent node</td>
<td>Remote DSMAGENT Node</td>
<td>Use the remotedsmagentnode parameter in the Data Protection for SQL configuration file (tdpsql.cfg)</td>
</tr>
</tbody>
</table>

Target node
This is the node name where Data Protection for SQL is installed. This node name (specified with the nodename option in the dsm.opt file) is referred to as the Data Protection for SQL 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 SQL 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 SQL configuration file (tdpsql.cfg by default). You can use the Configuration task in the Edit Menu of the GUI or the tdpsqlc set command to specify this parameter.

Agent node
The node name of a separate machine that must also have the backup-archive client and VSS provider installed. This machine is responsible for performing the movement of VSS snapshot data from local shadow volumes to the Tivoli Storage Manager server. This node name is referred to as the Remote DSMAGENT Node and is specified with the remotedsmagentnode parameter in the Data Protection for SQL configuration file (tdpsql.cfg by default). You can use the Configuration task in the Edit Menu of the GUI or the tdpsqlc set command to specify this parameter.
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 SQL options file (dsm.opt) and the backup-archive client options file (also dsm.opt).

**Specifying Data Protection for SQL options**

Once Data Protection for SQL is registered to a Tivoli Storage Manager server, several Data Protection for SQL 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 in the Data Protection for SQL directory. The default options file name is dsm.opt. To modify the initial dsm.opt file, display dsm.opt using a text editor.

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

- `nodename`
  - The Tivoli Storage Manager nodename is the unique name by which Tivoli Storage Manager knows the machine running Data Protection for SQL.

- `commmethod`
  - The communication protocols link the Data Protection for SQL node with the Tivoli Storage Manager server. Data Protection for SQL supports the same set of communication protocols supported by other Tivoli Storage Manager clients.
    - For Legacy backups, specify the `commmethod` option in the Data Protection for SQL 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`
  - A setting of `passwordaccess generate` 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 value is `prompt`.

  A utility program named dsmcutil.exe allows you to manage (update or display) 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.

**compression**

A setting of `compression on` 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 SQL 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 turn compression on if any of the following conditions exist:

- The network adapter has a data overload.
- Communications between the Data Protection for SQL and Tivoli Storage Manager server are over a low bandwidth connection.
- There is heavy network traffic.

**Considerations:**

- For Legacy backups, specify the `compression` option in the Data Protection for SQL 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.

It may be better to set `compression off` in the following cases:

- The computer running Data Protection for SQL has a CPU overload; the added CPU usage can impact other applications including SQL Server. You can monitor CPU and network resource utilization using the Performance Monitor program shipped with Windows.
- You are not constrained by network bandwidth; in this case, you can achieve the best performance by setting `compression off` and enabling hardware compaction on the tape drive, which also reduces storage requirements.

**Note:** The Tivoli Storage Manager administrator can override the compression option setting for the Data Protection for SQL 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).

See “How to enable SQL Server 2008 backup compression” on page 58

**clusternode**

A setting of `clusternode yes` directs the Tivoli Storage Manager API and Data Protection for SQL to be cluster-aware when running in a MSCS or...
VCS environment. This option must be specified for Data Protection for SQL to function properly in a MSCS or VCS environment.

**enablelanfree**

To perform a LAN-free Legacy backup with Data Protection for SQL, a Tivoli Storage Manager Storage Agent must be installed on the same machine and **enablelanfree yes** must be specified in the Data Protection for SQL options file. To perform a LAN-free VSS Backup with Data Protection for SQL, 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 SQL 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 Data Protection for SQL 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* (128-bit). 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 SQL 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.

For example, edit the appropriate options file by adding the following three options:

1. Add the **enableclientencryptkey yes** option.
2. Add the **encryptiontype** option with the type of encryption to use.
3. (Legacy backups only) Add your include statements with the **include.encrypt** option. For example, to encrypt all SQL data, specify the following:
   
   ```
   include.encrypt *\...\*
   ```

   To encrypt all objects with database name *Db1* beginning with *Db*, specify the following:
   
   ```
   include.encrypt \...\Db*\...\*
   ```

   To encrypt all full or differential objects with database name *Db1*, specify the following:
   
   ```
   include.encrypt \...\Db1\full*  
   include.encrypt \...\Db1\diff*
   ```

**Note:**

1. If you are running Data Protection for SQL on a MSCS or VCS, the options files on each node of the cluster must be identical.
2. You can create additional Data Protection for SQL options files to point to other Tivoli Storage Manager servers. You might also want to create more than one options file, each with different parameters, to use with a single Tivoli Storage Manager server.

**Specifying Data Protection for SQL preferences**

Data Protection for SQL configuration parameters are defined in the Data Protection for SQL configuration file (tdpsql.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 SQL configuration parameters in two ways:

- The **Configuration** task in the **Edit Menu** of the Data Protection for SQL GUI. See [Configuration on page 177](#).
- The **tdpsql set** command in the Data Protection for SQL Command Line Interface. See “**Set command** on page 177”.

Note the following characteristics of Data Protection for SQL configuration parameters:

- The value of a configuration parameter specified on a command line invocation overrides (but does not change) the value of the configuration parameter specified in the Data Protection for SQL configuration file.
- During a command line invocation that does not specify an overriding value for a configuration file parameter, the values in the default Data Protection for SQL configuration file (tdpsql.cfg) are used.

See “**Set command** on page 177” for descriptions of available configuration parameters.

Set policy for VSS backups by specifying the VSSPOLICY statement in your Data Protection for SQL configuration file, or by selecting **Utilities -> VSS Policy Binding** in the Data Protection for SQL GUI, and then configuring the policy.

Note that you must specify this statement manually. You cannot specify it using the **tdpsql set** command or the **Configuration** task in the **Edit Menu** of the Data Protection for SQL GUI. See “**Setting automatic expiration (VSS and Legacy)**” for detailed information and examples.

**Setting automatic expiration (VSS and Legacy)**

Data Protection for SQL allows you to utilize Tivoli Storage Manager automatic expiration and version control by policy. You set automatic policy for backup data by editing the Data Protection for SQL options file, or by specifying them in the Data Protection for SQL GUI (**Utilities -> VSS Policy Binding**). If you edit the options file, use **include** and **exclude** statements to define which files are subject to automatic processing, and to assign specific management classes to files using object naming conventions.

**Setting automatic expiration for VSS**

Set policy for VSS backups by specifying the VSSPOLICY statement in your Data Protection for SQL configuration file, or by specifying them in the Data Protection
for SQL GUI (Utilities -> VSS Policy Binding). Note that you cannot specify it using the `tdpsqlc set` command or the Configuration task in the Edit Menu of the Data Protection for SQL GUI.

VSSPOLICY statements are processed from the bottom up and processing stops at the first match. To ensure that more specific specifications are processed at all, the more general specification should be listed before the more specific ones, so as to be processed after the more specific specifications. Otherwise, the more general specification will match the target before the more specific specifications are seen.

Specify the following information in the VSSPOLICY statement:

```
VSSPOLICY <srvname> <dbname> <backuptype> <backupdest> <mgmtcls>
```

The statement contains the following values:

- `<srvname>` Name of the SQL Server or wildcard character: *
- `<dbname>` Name of database or wildcard character: *
- `<backuptype>` Backup type: FULL or wildcard character: *
- `<backupdest>` Backup destination: TSM or LOCAL or wildcard character: *
- `<mgmtcls>` Management Class name. This sets the management class for the specified class of backup.

**Note:** Since VSS supports full backup types only, specifying a wildcard character for `<backuptype>` performs a full backup only.

- `<backupdest>` Backup destination: TSM or LOCAL or wildcard character: *
- `<mgmtcls>` Management Class name. This sets the management class for the specified class of backup.

**Setting automatic expiration for Legacy**

Data Protection for SQL allows you to utilize Tivoli Storage Manager automatic expiration and version control by policy. Setting automatic policy for backup data is accomplished through the Data Protection for SQL options file. Use `include` and `exclude` statements in the options file to define which files are subject to automatic processing, and to assign specific management classes to files using object naming conventions.

**Note:** It is recommended that you ensure metadata is available for query without causing a volume mount. The metadata is stored as a data object on the Tivoli Storage Manager server and is available for migration to removable media if its policy allows this to occur.

A Data Protection for SQL backup object name is composed of a series of qualifiers separated by `\`.

The general include/exclude syntax for object naming is:

```
include "ObjectNameSpecification" [ManagementClassName]
exclude "ObjectNameSpecification"
```

where:

**ObjectNameSpecification is:**

```
SqlServerName\[InstanceName]\dataType...\DatabaseName[\
  typeInfo]\backupType*
```
dataType is:
  meta | data

typeInfo is:
  LogicalFileName (for file backup type)
  GroupName (for group backup type)
  ... (for log and set backup types)
  not used for full and diff backup types

backupType is:
  full | diff | log | group | file | set

Considerations:

• 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: \...
• All specifications must end with the wildcard character *. This is required because the specification must match both object names and temporary names. Temporary names are used to enable rolling back a backup transaction if an error occurs. Temporary names are object names with a unique string appended to the backupType qualifier.
• An objectNameSpecification should be placed within double quotation marks. If the specification includes spaces or special characters, the double quotes are required.
• For exclude statements, meta should be a match in the specification, either explicitly, or by wildcard or ellipses. Excluding meta excludes the entire object.
• Include statements can specify either meta or data separately and explicitly, or both by wildcard or ellipses.
• You may specify both data and meta objects in options file include lists in order to assign management classes. However, when you use exclude statements, you should specify only the meta objects. If a data object is not backed up, its meta object will not be created.
• Log and set object names are always unique. The typeInfo contains the qualifiers whose values make them unique. Because they are generated at the time of the backup, they are not predictable and you cannot specify them.
• 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, you should list the more general specifications before the more specific ones so that they will be processed after the specific. Otherwise, the more general will match the target before the more specific 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 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.

- Include/exclude processing does not produce error messages for invalid specifications. Therefore, you should thoroughly test all include/exclude lists. Specifying an invalid management class name will generate an error message in the dsierror.log.

- In regard to case-sensitivity, the Windows Tivoli Storage Manager API currently assumes the specifications are for a Windows file system and ignores case. However, because case may be honored in the future, you should always use the correct case. Specifically,
  - Use correct case for SQL names (server, database, group, or file names) as displayed by the **query sql** or **query tsm** commands.

The following are examples of individual **objectNameSpecifications** as they might appear in include/exclude statements:

**SqlServerNames:**
  - SQL2000, SQL2005

**InstanceNames:**
  - INST1, INST2

**DatabaseNames:**
  - Db1, Db2, Db3

**GroupNames:**
  - g1, g2, g3

**LogicalFileNames:**
  - f1, f2, f3

For complete sample illustrations of **include** and **exclude** statements using the syntax outlined above, refer to Appendix D, “Examples of Tivoli Storage Manager policy binding using include/exclude and VSSPOLICY statements,” on page 211.

**How to enable SQL Server 2008 backup compression**

Data Protection for SQL 5.5.4 introduces initial support for SQL Server 2008 backup compression. To enable this feature, add this statement to the SQL configuration file (tdpsql.cfg). Edit the file and enter the command as follows:

```
SQLCOMPression Yes | No
```

The default value is No

SQLCOMPression is only available with Legacy backups on SQL Server 2008 (or later). For SQL Server 2008, backup compression is only supported on Enterprise Edition. SQL Server 2008 R2, backup compression is supported on Standard, Enterprise, and Datacenter editions. Starting with SQL Server 2008, any edition can restore a compressed backup.

SQL Server 2008 backup compression is generally faster and more effective than using it together with Tivoli Storage Manager compression. Tivoli Storage Manager compression is also effective at reducing the backup window needed to protect SQL Server and is a good choice for SQL Server 2005 (or earlier).
Part II: Configuration procedure

This section provides step-by-step instructions on how to configure the required applications to perform Data Protection for SQL backup and restore operations. Configuration tasks are presented in sequential order based on the location of where the tasks must be performed:

1. On the Tivoli Storage Manager server
2. On the machine running the SQL Server
3. On the machine running the off-loaded backups (VSS only)

Attention:

If you plan to perform VSS operations in a MSCS or VCS environment, make sure to specify the following options in each of the dsm.opt files that are used for the LOCALDSMAGENT and REMOTEDSMAGENT machines:

   CLUSTERNODE NO
   CLUSTERDISKSONLY NO

1. On the Tivoli Storage Manager server:

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 SQL backup and restore requirements. For VSS operations, Tivoli Storage Manager server authentication must be on.

   Additional information:
   1. “How Tivoli Storage Manager server policy affects Data Protection for SQL” on page 19
   2. “Recommended Tivoli Storage Manager policy settings” on page 47

2. Register your Data Protection for SQL node name and password with the Tivoli Storage Manager register node command. For example:

   register node <DPnodename> <DPpassword>

   For VSS operations, this node is the Target Node. Note that when registering nodes to the Tivoli Storage Manager server specifically for VSS operations, do not specify the Tivoli Storage Manager Userid=NONE parameter. VSS operations will fail when this parameter is specified.

   Additional information:
   1. “Data Protection for SQL node name: Recommended settings” on page 49

3. If not already defined, register your Tivoli Storage Manager backup-archive client node name and password for the machine where the SQL Server installed. For example:

   register node <BAnodename> <BApassword>

   For VSS operations, this agent node is the Local DSMAGENT Node.

   Additional information:
   1. “Proxy node definitions (VSS Backups)” on page 50

4. (VSS only) If you plan to perform off-loaded backups, register the Tivoli Storage Manager backup-archive client node name and password for the machine that will perform the VSS off-loaded backups. For example:

   register node <BAOFF> <BAOFFpassword>
This agent node is the Remote DSMAGENT Node. Note that 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. If you do not plan to perform off-loaded backups, you can skip this step.

Additional information:
- "Proxy node definitions (VSS Backups)" on page 50

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

   Additional information:
   - "Proxy node definitions (VSS Backups)" on page 50

2. On the machine running the SQL Server:

   Perform these steps on the machine where the SQL Server is installed and running:
   1. Specify your Data Protection for SQL node name and communication method in the dsm.opt file located (by default) in the Data Protection for SQL installation directory. Additional options are also available.
      - For additional information, see "Specifying Data Protection for SQL options" on page 52.
   2. Specify your Data Protection for SQL preferences (such as language, date format, log file, etc.) in the tdpsql.cfg file located (by default) in the Data Protection for SQL installation directory. Use the set command or the Configuration task in the Edit Menu of the Data Protection for SQL GUI.
      - For additional information, see "Specifying Data Protection for SQL preferences" on page 55 and "Set positional parameters" on page 178.
   3. (VSS Only): Specify your VSSPOLICY statement in the Data Protection for SQL configuration file or use the Data Protection for SQL GUI in the Utilities->VSS Policy Binding menu.
      - For additional information, see "Specifying Data Protection for SQL preferences" on page 55 and "Set positional parameters" on page 178.
   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 can guide you through the configuration process (if needed). In the backup-archive client GUI menu, select Utilities->Setup Wizard->Help me configure the TSM Backup Archive Client. Note that the node name for this machine is referred to as the Local DSMAGENT Node and is specified with the localdsmagentnode parameter in the Data Protection for SQL configuration file (tdpsql.cfg by default).
      - For additional information, see "Proxy node definitions (VSS Backups)" on page 50.
   5. (VSS Only): Install and configure the Tivoli Storage Manager Client Acceptor Daemon (CAD) Service (if not already installed and configured). You can use an existing client CAD Service if one is already installed and configured. The backup-archive client Setup Wizard can guide you through the CAD installation process (if needed). In the backup-archive client GUI menu, select Utilities->Setup Wizard->Help me configure the TSM Web Client. Make sure this 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. The backup-archive client Setup Wizard can guide you through the configuration process. In the backup-archive client GUI menu, select **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):** Install Tivoli Storage FlashCopy Manager or the Tivoli Storage Manager Copy Services SQL VSS Integration Module from the product (if it is not already installed).

8. **(VSS Only):** If you plan to perform VSS Instant Restores, install the Tivoli Storage Manager Copy Services Hardware Devices Snapshot Integration Module from the product (if it is not already installed). Note that a SAN Volume Controller, DS6000, DS8000, or XIV Gen 2 storage subsystem is also required to perform VSS Instant Restores.

9. **(VSS Only):** Install and configure a VSS provider. Consult the VSS provider documentation for information regarding configuration of that software. Note that there is no installation or configuration required if you are using the default Windows VSS System Provider.

10. **(VSS Only):** Change the SQL Server VSS Writer from Manual to Automatic and start the service.

11. **(VSS Only):** Define storage space to hold VSS Backups that will reside on local shadow volumes. Make sure you define enough space to hold all copies of the VSS Backups as designated by your policies. Refer to your VSS Provider documentation for information about how to provision the local shadow volumes. See "Back up to Tivoli Storage Manager storage versus back up to local shadow volumes" on page 42 for recommendations regarding sufficient disk storage space.

3. **On the machine running the Off-loaded backups (VSS only):**

Perform these steps on the machine running the off-loaded 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. The backup-archive client Setup Wizard can guide you through the configuration process (if needed). In the backup-archive client GUI menu, select **Utilities->Setup Wizard->Help me configure the TSM Backup Archive Client.** Note that the node name for this machine is referred to as the Remote DSMAGENT Node and is specified with the **remotedsmagentnode** parameter in the Data Protection for SQL configuration file (tdpsql.cfg by default).

2. Install and configure the Tivoli Storage Manager Client Acceptor Daemon (CAD) Service (if not already installed and configured). You can use an existing client CAD Service if one is already installed and configured. The backup-archive client Setup Wizard can guide you through the CAD installation process (if needed). In the backup-archive client GUI menu, select **Utilities->Setup Wizard->Help me configure the TSM Web Client.**

3. Install and configure the Tivoli Storage Manager Remote Client Agent Service (DSMAGENT). The backup-archive client Setup Wizard can guide you through the configuration process. In the backup-archive client GUI menu, select **Utilities->Setup Wizard->Help me configure the TSM Web Client.**
4. 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.

**Part III: Verify your configuration**

Before attempting to perform a backup or restore operation, verify that Data Protection for SQL is installed and configured correctly by running the `query SQL` command on the machine where the SQL Server is installed and running. For example:

```bash
tdpsqlc query SQL
```

This command returns information and status about the SQL Server, databases, and VSS components (when configured for VSS operations). The following output example shows that the configuration is correct and ready for Legacy backups, VSS Backups (Local DSMAgent Node), and VSS Off loaded backups (Remote DSMAgent Node):

**IBM Tivoli Storage Manager for Databases:**
**Data Protection for Microsoft SQL Server**  
**Version 5, Release 5, Level 4.0**  
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Connecting to SQL Server, please wait...

SQL Server Information

```
SQL Server Name  .......... SERVERA
```

Volume Shadow Copy Service (VSS) Information

```
Writer Name : SqlServerWriter
Local DSMAgent Node : servera_ba
Remote DSMAgent Node : servera_offload
Writer Status : Online
Selectable Components : 7
```

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 4. Using the graphical user interface

The Data Protection for SQL GUI consists of a main window with a common menu bar, toolbar, and five secondary windows: two for backup operations, two for restore operations, and one for inactivate operations. Each of these windows consists of a directory tree control in the left pane and a tab control in the right pane including operation controls and a list control to display information.

Menu bar

The menu bar consists of the following items and menu list functions:

File
- Exit the program.

Edit
- Configure Data Protection for SQL preferences. The default configuration file is tdpsql.cfg.

View
- Refresh the tree view or display the inactivate tab.

Utilities
- Change the Tivoli Storage Manager password, set SQL Server login information, show server information for both the Tivoli Storage Manager server or the SQL Server, or bind VSS backups to Tivoli Storage Manager server policy.

Help
- Obtain Data Protection for SQL help to assist with GUI tasks, Tivoli Storage Manager Web access, or information about Data Protection for SQL.

Edit menu

Use the Edit menu to change Data Protection for SQL configuration settings.

The Edit->Configuration menu allows you to modify the Data Protection for SQL configuration file. If a configuration file is not specified, the tdpsql.cfg file is used. If no configuration file is found, a default file is created which contains just the lastprunedate value; all other options use default values. A different configuration file can be specified by invoking the GUI from the command line with the /configfile parameter specified.

Clicking this menu item displays the Data Protection for SQL Settings dialog with the following five tabs and their parameters:

General tab

This tab displays the preferences page for general configuration parameters.

SQL Server
- Specifies the SQL server that Data Protection for SQL logs on to.

From SQL Server
- Specifies the SQL server that backup objects were backed up from. This parameter is necessary only when the name of the SQL server to restore to, as determined by the SQL Server parameter, is different from the name of the SQL server that the backup objects were created from.
SQL Authentication
Specifies the authorization mode used when logging on to the SQL server.

- Integrated (default) Specifies to use a trusted connection and allow Windows to authenticate the logon.
- SQL User ID Specifies to use SQL User ID security. With this type of security, the administrator provides the logon ID and the password to logon to Data Protection for SQL.

Wait for Tape Mounts for Backup or Restore
Specifies whether Data Protection for SQL backup and restore commands wait for the media mount or stop the current operation. The initial value is yes.

Use VSS Backup as the default Backup method.
Specifies that VSS Backup is the default backup method. A Local DSMAGENT Node name must be specified. VSS Backups can only be restored using VSS.

Estimate % Change for Differential Backup
Specifies the value for the estimated change to database pages for differential backups. This estimate is used by Data Protection for SQL to determine if sufficient storage space is available for the backup. The value specified here becomes the default value for all differential backups. This option is available with Legacy operations only.

Performance tab
This tab displays the preferences page for performance configuration parameters.

DP Buffers (3 by default)
Specifies the number of communication data buffers Data Protection for SQL uses when transferring data between Data Protection for SQL and the Tivoli Storage Manager server. Each buffer is the size specified by the TDP Buffer Size option. Note that this option applies to Legacy backups only.

DP Buffer Size (1024 by default)
Specifies the size of the buffers used by Data Protection for SQL to transfer data to the Tivoli Storage Manager server. Note that this option applies to Legacy backups only.

Stripes (1 by default)
Specifies the number of data stripes (1 to 64) to use in a Legacy backup or Legacy restore operation. The default value is 1. Note that this option applies to Legacy backups only.

SQL Buffers (0 by default)
Select a number (0 to 999) that specifies the number of communication data buffers Data Protection for SQL uses when transferring data between the SQL Server and Tivoli Storage Manager server. Each buffer is the size specified in the TDP Buffer Size option. Note that this option applies to Legacy backups only.

SQL Buffer Size (1024 by default)
Select a number (64 to 4096) that specifies the size of the buffers used by Data Protection for SQL to transfer data from the SQL Server to Data Protection for SQL. Note that this option applies to Legacy backups only.
**Logging tab**

This tab displays the preferences page for logging configuration parameters.

*Log File Name (tdpsql.log by default)*

Specifies the name of the file into which you want Data Protection for SQL to write activity log information.

*Prune Old Entries (selected by default)*

Check this box to enable pruning of the activity log.

- **Number of days to keep** (60 by default) Use this field to specify the number of days worth of entries to keep in the activity log. Data Protection for SQL prunes entries greater than this number when you initialize this application.
- **Prune Now** Click Prune Now to prune the activity log immediately.

**Regional tab**

This tab displays the preferences page for regional configuration parameters.

*Language (American English by default)*

Specify the language to use for displaying the GUI and Data Protection for SQL messages. You can select from the following:

- English (United States) (This is the default).
- Brazilian Portuguese
- Chinese (Simplified)
- Chinese (Traditional)
- French
- German
- Italian
- Japanese
- Korean
- Spanish

The language pack for the desired language must be installed in order to display the GUI and message information in the specified language. See "Installing the language packs" on page 38 for instructions. The language you specify does not become effective until you exit and restart the GUI.

*Date Format (mm/dd/yyyy by default)*

Click one of the following buttons for the date format of your choice.

- **dd** Day of the Month
- **mm** Month of the Year
- **yyyy** Year

*Time Format (hh:mm:ss by default)*

Click one of the Time Format buttons to select a format for displaying time.

- **hh** Hours (24-hour day)
- **mm** Minutes in an hour
- **ss** Seconds in a minute
**Number Format** *(xxx,xxx.dd by default)*
Click one of the Number Format buttons to select a format for displaying numbers. The choices on the display represent several ways to place the decimal, comma, and spaces.

**VSS Backup tab**
This tab displays the preferences page for VSS Backup configuration parameters.

**Default Backup Destination** *(TSM Server by default)*
Select the default storage location for your backups. You can select from the following storage locations:

- **TSM Server**
  The data is stored on Tivoli Storage Manager server storage only.
  This is the default.
- **Local**
  The backup is stored on local VSS disk only.
- **Both**
  The backup is stored on both Tivoli Storage Manager server storage and local VSS disk.

Note that this parameter is only valid when using the VSS Backup method.

**Local DSMAGENT Node name**
Specify the Tivoli Storage Manager node name (agent node) of the local client machine that performs VSS operations. This parameter must be specified for VSS operations to be performed. See the *IBM Tivoli Storage Manager for Databases 5.5.0: Data Protection for Microsoft SQL Server Installation and User's Guide* for instructions about how to configure this node.

**Remote DSMAGENT Node name**
Specify the Tivoli Storage Manager node name (agent node) of the remote client machine that moves the VSS data from local VSS disks to Tivoli Storage Manager server storage during off-loaded backups. See the *IBM Tivoli Storage Manager for Databases 5.5.0: Data Protection for Microsoft SQL Server Installation and User's Guide* for instructions about how to configure this node.

For specific considerations related to these configuration settings, refer to "Set command" on page 177.

**View menu**

The View menu allows you to modify the objects you can view.

Clicking this menu item displays these Data Protection for SQL dialogs:

**Refresh tree view**
By refreshing the GUI, you can:
- clear any selections.
- collapse the tree to the level you have highlighted.
- collapse corresponding tab trees even if they are not currently displayed (e.g., refreshing the Backup Databases tree also refreshes the Backup Groups/Files tree)
- display new backup operations in the restore trees.
Note: If you move back and forth between tabs without refreshing, you do not lose the current selections or tree view.

Inactivate tab
Checking this item adds the tab control to the backup and restore windows allowing you to inactivate SQL databases in Tivoli Storage Manager storage. Note that this dialog applies to Legacy backups only.

Utilities menu

The Utilities menu allows you to change the Tivoli Storage Manager password and view information from the SQL server and Tivoli Storage Manager server.

Change TSM password
This dialog box prompts you to enter the old password and the new password twice to verify it. See also “Changetsmpassword command” on page 185.

SQL Server Login settings
The SQL Server Login Information dialog allows you to select the following:
• Use Windows Authentication (selected by default)
• Use SQL Authentication; if you select this option, you need to fill in a user id (sa by default) and password (blank by default).

Show TSM Server information
This window displays the following Connection Information:
• Nodename
• Server Network Host Name
• Tivoli Storage Manager API Version
• Server Name
• Server Type
• Server Version
• Compression Mode
• Domain Name
• Active Policy Set
• Default Management Class

VSS Policy Binding
This dialog box contains options for creating new VSS policy bindings and updating existing VSS policy bindings.

Show MS SQL Server information
This window displays the following SQL Server information:
• SQL Server Name
• Version
• MSCS Cluster
Help menu

The Help menu allows you to access these help resources.

**TSM Web Access**
This dialog launches a list of information that is available online.

**DP for SQL Help**
This dialog launches online help.

**About Data Protection for SQL**
This dialog launches version, release, and modification level information about Data Protection for SQL.

Toolbar

The toolbar provides shortcuts to frequently used items. Three buttons are available:
- Refresh tree view
- Edit Data Protection for SQL configuration
- Launch Data Protection for SQL online help

Backup and restore windows

Data Protection for SQL offers separate windows for backup and restore operations, each with its own tree, list, and tab controls. Data Protection for SQL provides distinct trees populated with database names; the list control displays additional information according to what is highlighted in the tree view. For backup operations, Data Protection for SQL displays in the tree only one entry per database name. However, each database name in a restore tree corresponds to a backup object, and there may be multiple backup objects for a database name. You can make backup and restore selections from both the tree and list controls.

**Note:**
1. The initial window visible upon startup of the GUI is the backup window, specifically the **Backup Databases** window.
2. You cannot close, minimize, or move the backup or restore windows independently from the main window.

Expanded backup options

To support Data Protection for SQL expanded Legacy backup options, the Data Protection for SQL GUI is no longer limited to just a database and its log as the smallest selectable units for backup. You can now select a **group** backup (parts of a database), **file** backup (part of a group), or **differential** backup (changed pages in a database). Data Protection for SQL also allows a **set** backup to force the creation of a **single** Tivoli Storage Manager object containing the data for a specified set of groups and files when certain restore scenarios require this.

The right pane of each window always displays both backup and restore tabs, though the actual window with its tree and list visible at any time (either backup or restore windows) depends on which of those functions is currently selected. Five tabs are available for selection:
### Table 16. GUI tab functions

<table>
<thead>
<tr>
<th>Tab Selection</th>
<th>Function</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Backup Databases</strong></td>
<td>• Perform full, differential, and log Legacy backups.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Perform full VSS Backups.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Backing up SQL databases (Legacy method)&quot; on page 71</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Backing up SQL databases (VSS method)&quot; on page 73</td>
<td></td>
</tr>
<tr>
<td><strong>Backup Groups/Files</strong></td>
<td>Perform group, file, and set backups.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Backing up SQL groups or files (Legacy method)&quot; on page 72</td>
<td></td>
</tr>
<tr>
<td><strong>Restore Databases</strong></td>
<td>• Restore from full, differential, and log Legacy backups.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Restore full VSS Backups.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Restoring full, differential, and log backups (Legacy and VSS)&quot; on page 74</td>
<td></td>
</tr>
<tr>
<td><strong>Restore Groups/Files</strong></td>
<td>Restore from full, group, file, set, and log backups.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Restoring file groups and files (Legacy)&quot; on page 76</td>
<td></td>
</tr>
<tr>
<td><strong>Inactivate</strong></td>
<td>Specifically select objects for inactivation apart from automated inactivation.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&quot;Inactivating SQL databases (Legacy only)&quot; on page 81</td>
<td></td>
</tr>
</tbody>
</table>

### Selecting databases and displaying information

On each tab page in the right pane, the list control area provides information about the database highlighted or selected in the directory tree view. Items will participate in the backup or restore process only when they are also selected (the icon checked) in the tree. To use the tree controls to select databases and display database information, do the following:

1. Initially expand a directory tree by double-clicking either the SQL server node icon or node name **SQL Server** under the **Data Protection for SQL Backup** or **Data Protection for SQL Restore** root nodes, or expand by clicking the plus sign (+). The SQL server name folder then displays.

**Note:** Multiple server names may appear in restore trees if backup objects from different SQL server instances exist on the same node, but you cannot switch server instances from the GUI for backup operations.
2. Expand the server name folder by double-clicking it or the selection icon or by clicking the plus sign (+). Expanding a backup tree displays all databases on the SQL server, while expanding restore trees displays backup objects.

3. Highlight a database or database object in the tree by clicking the square selection icon or the item name. Highlighting simply displays detailed information in the list about that item even if the item is not expanded in the tree. Note that clicking only the item's name highlights it without selecting it for operation.

4. Select an item to participate in an operation by clicking the selection icon. A red checkmark appears on a yellow icon to indicate that it is selected. The selection icon is a simple toggle; by clicking it, you can:
   - Select it if it was previously unselected.
   - Deselect it if it was previously selected.

**Note:**

1. You cannot view selections from multiple directories in the list; only one directory can be highlighted at a time. To view selections from multiple databases, highlight your SQL server name in the tree.

2. Database selections always propagate down the hierarchy; that is, when you select a database, all of its sub-parts are selected. Selecting a group also selects its files. In addition, selecting all of an item's sub-parts selects the item itself. Deselecting items works in the same way.

3. When you select only part of a database for an operation, each icon for the items in its path becomes half (partially) selected.

4. Items unavailable for backup operations will display X in the selection icon.

5. Items marked "Suspect" will display the character ! in the selection icon and are unavailable for selection.

6. When you expand the SQL server node, a prompt for SQL logon information (SQL administrator ID and password) will be presented if you have specified sqluserid as the SQL Authentication method in your Data Protection for SQL configuration file, and if this information cannot be located in the registry. Data Protection for SQL attempts to log on to the SQL server specified. If you have not entered the server name through the command line, the logon attempt is to the default SQL server. If the logon attempt fails, you are asked to exit and re-enter the application using the /sqlserver option. The logon information is saved in the registry. You will remain logged on to the SQL server until the Data Protection for SQL GUI is closed.

7. If you have backed up data from more than one SQL server with the same node, the additional servers will show up in the restore tree.

8. To view a different nodename's backups, specify a different dsm.opt file (you can use the /sqlserver, /configfile, or /tsmoptfile parameters). A different options file or the /tsmoptfile parameter can also be used to view backups on a different Tivoli Storage Manager server.
GUI backup tasks

Information needed to perform back up operations is provided.

Backup tree

In the Backup Databases window, you cannot expand database items in the tree. When you highlight a database in the tree, detailed information is displayed in the list.

In the Backup Groups/Files window, you can expand database items in the tree because this window supports backups at a sub-database level. A highlighted database displays a list of groups, and a highlighted group displays a list of files. Special selection propagation rules apply in this window:

- For group backups, selections propagate up the hierarchy to the group level. For example, if you expand a database and select a file in the tree, the container group and all of its other files are also selected.
- For file and set backups, selections are never propagated up the hierarchy.
- For set backups, a selection at the database level means that all groups will be backed up in the set.

Backup list

When you highlight an expanded SQL server name or database from either tab for a backup operation, the list control displays the following information:

- Database name
- Database space used
- Transaction log space used
- Database compatibility level
- Database attributes (as a list)
  - Select into/bulk copy
  - Truncate log on checkpoint
  - Read only
  - Single user
  - System Database
  - DB owner use only

Back up SQL databases (Legacy method)

Three types of backup are supported from the Backup Databases tab control:

Full Backs up all of a database plus part of the transaction log.

Differential Backs up only the parts of a database changed since the last full backup plus part of the transaction log.

Log Backs up the transaction log only, with or without truncation.

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

1. Start the Data Protection for SQL GUI. If you are running Data Protection for SQL in an MSCS or VCS, you MUST invoke the GUI with the /sqlserver
parameter from the Data Protection for SQL command line. The interface opens with a view of the Backup Databases window.

2. Click the plus sign in the tree view to the left of the SQL Server. The view expands to display the databases on the server.
3. Click the selection box to the left of a database to select the database for backup. After the database has been selected, the selection box changes to a selected state.
4. In the Backup Options section, select Legacy Backup. You can also select these additional options:
   - Stripes
   - Diff Est % Chg
   - Truncate Log
   - Log Est % Chg
   See "Edit menu" on page 63 for details regarding these options.
5. Specify the type of backup to perform with the Backup Type drop-down menu.
6. Click the Backup button to start the backup operation.

The Backup Progress window is displayed to inform you whether or not the operation completed successfully and lists the object(s) backed up with detailed status information.

**Backing up SQL groups or files (Legacy method)**

Three types of backup are supported from the Backup Groups/Files tab control:

- **Group** Backs up the contents of the specified file group.
- **File** Backs up the contents of the specified logical file.
- **Set** Backs up the contents of the specified groups and files.

**Attention:** You must back up the transaction logs after completing a Group, File, or Set backup operation. See "Backup types" on page 14 for a description of a log backup.

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

1. Start the Data Protection for SQL GUI. If you are running Data Protection for SQL in a MSCS or VCS, you MUST invoke the GUI with the /sqlserver parameter from the Data Protection for SQL command line. The interface opens with a view of the Backup Databases window. Click on the Backup Groups/Files Tab.
2. Click the plus sign in the tree view to the left of a SQL Server that you want to back up. The view expands to display the databases on the server. Expand the tree again to see individual file groups. Expand the tree once again to see individual files.
3. Click the selection box to the left of a database object to select the object for backup. After the object has been selected, the selection box changes to a selected state.
4. Specify the type of backup to perform in the Backup Type box.
5. If striping is enabled, you can select the number of stripes with the Stripes option.
6. Click on the Backup button to begin the backup operation.
Backing up SQL databases (VSS method)

This procedure assumes that Data Protection for SQL, the Tivoli Storage Manager backup-archive client, the Tivoli Storage Manager server, the Microsoft SQL VSS Integration Module, and a VSS provider are properly configured in your environment. See "Configuring Data Protection for SQL" in the Data Protection for SQL Installation and User’s Guide for detailed instructions on how to configure these applications. You must have local registry rights (for all versions of SQL Server) to perform a Data Protection for SQL backup.

Follow these steps to perform a VSS Backup of your data:

1. Start the Data Protection for SQL GUI. If you are running Data Protection for SQL in a MSCS or VCS, you MUST invoke the GUI with the /sqlserver parameter from the Data Protection for SQL command line. The interface opens with a view of the Backup Databases window.

2. Make sure a Local DSMAGENT Node name is specified. You can specify this node name using the "Edit menu" on page 63 window. From the File Menu, click on Edit -> Configuration -> VSS Backup Tab.

3. From the Tree View, select one or more databases to back up.

4. In the Backup Options section of the Backup window, select the VSS Backup method. Note that this method will automatically be selected when the Use VSS Backup as the default Backup method option is selected in the "Edit menu" on page 63 window. If the Microsoft SQL VSS Integration Module is not installed, the VSS Backup method is not available.

5. Specify the storage destination of your backup with the Backup Destination drop-down menu.

6. By default, the Backup Type drop-down menu specifies Full. You can only perform a full backup with the VSS Backup method.

7. Click on the Backup button to begin the backup operation.

Backing up SQL databases (VSS off-loaded method)

An off-loaded backup uses an alternate machine to move SQL data to Tivoli Storage Manager server storage. This may reduce the impact on network, I/O, and CPU resources during backup processing.

This procedure assumes that Data Protection for SQL, the Tivoli Storage Manager backup-archive client, the Tivoli Storage Manager server, the Microsoft SQL VSS Integration Module, and a VSS or VDS provider are properly configured in your environment. See "Configuring Data Protection for SQL" in the Data Protection for SQL Installation and User’s Guide for detailed instructions on how to configure these applications. You must have local registry rights (for all versions of SQL Server) to perform a Data Protection for SQL backup.

Follow these steps to perform a VSS off-loaded backup of your data:

1. Start the Data Protection for SQL GUI. If you are running Data Protection for SQL in a MSCS or VCS, you MUST invoke the GUI with the /sqlserver parameter from the Data Protection for SQL command line. The interface opens with a view of the Backup Databases window.
2. Make sure a **Local DSMAGENT Node name** is specified. You can specify this node name using the "Edit menu" on page 63 window. From the File Menu, click on **Edit -> Configuration -> VSS Backup Tab**.

3. Make sure a **Remote DSMAGENT Node name** is specified. You can specify this node name using the "Edit menu" on page 63 window. From the File Menu, click on **Edit -> Configuration -> VSS Backup Tab**.

4. From the Tree View, select one or more databases to back up.

5. In the Backup Options section of the Backup window, select the **VSS Backup method**. Note that this method will automatically be selected when the **Use VSS Backup as the default Backup method** option is selected in the "Edit menu” on page 63 window. If the Microsoft SQL VSS Integration Module is not installed, the **VSS Backup method** is not available.

6. In the Backup Destination drop-down menu, select **TSM Server (Offloaded)**.

7. By default, the Backup Type drop-down menu specifies **Full**. You can only perform a full backup with the VSS Backup method.

8. Click on the **Backup** button to begin the backup operation.

---

**GUI restore tasks**

Information needed to perform restore operations is provided.

**Restoring full, differential, and log backups (Legacy and VSS)**

When you restore a database, keep in mind that data which exists in the database is overwritten and is no longer available after the restore is complete. Restore Databases Allows you to restore databases or parts of databases only from **full**, **differential**, and **log** backups. Although VSS only supports full backups, Legacy differential and Legacy log backups can be applied after a full VSS Backup has been restored.

- Make sure to review the "**VSS Restore considerations” on page 76 before attempting any type of VSS Restore.
- A Legacy restore or VSS Restore of the master database requires special attention. See **Appendix E, “Restoring the master database,” on page 215** for step-by-step instructions.

Special selection propagation rules apply to the **Restore Databases** tab control.

In this mode, only **full**, **difffull**, and **log** backups appear in the tree.

- Selecting a full \( F_0 \)...  
  - clears all other fulls and associated logs and difffulls.
- Selecting a difffull \( D_0 \)...  
  - selects the prior full \( F_0 \).
  - clears all difffulls and logs between \( F_0 \) and \( D_0 \).
- Selecting a log \( L_0 \)...  
  - selects the previous difffull \( D_0 \) if it exists.
  - selects the previous full \( F_0 \).
  - selects all logs between \( L_0 \) and \( D_0 \) if \( D_0 \) exists, or between \( L_0 \) and \( F_0 \) if \( D_0 \) does not exist.
  - clears all logs and difffulls between \( F_0 \) and \( D_0 \) if \( D_0 \) exists.
- Clearing a full \( F_0 \)...  
  - clears its associated logs and difffulls.
Perform these steps to restore your SQL databases:

1. Open the Data Protection for SQL GUI. If you are running Data Protection for SQL in a MSCS or VCS, you must invoke the GUI with the /sqlserver parameter from the Data Protection for SQL command line.

2. Click the Restore Databases tab. The restore view appears.

3. Check the Show Active and Inactive check box if you want to display inactive backup objects (that have not yet been deleted from the Tivoli Storage Manager inventory) in addition to active backup objects.

4. Click the plus sign in the tree view to the left of the SQL Server from which you want to restore a full, differential, or transaction log backup. Note that VSS Restore operations are available for full VSS Backups only. The tree view expands to show the names of SQL Servers on that Tivoli Storage Manager node for which Data Protection for SQL backups exist.

5. Click the plus sign in the tree view to the left of the SQL Server that you want to restore from. The tree expands again and shows the databases available for restore processing.

6. Click the plus sign in the tree view to the left of the database that you want to restore. The database expands to show the types of backups available for restore.

7. Click the selection box in the tree view to the left of the full, differential, or transaction log backup that you want to restore. The selection box changes to show the backup objects that are now selected.

8. Right-mouse click on the backup object to view a menu that contains the following restore options:
   - **Restore Into**
   - **Relocate**
   - **Standby Server Undo File**

   If an option is unavailable, then the option is not supported for the selected backup object.

9. Select the desired Restore Options for your backup.

   - (Legacy only) If you want to perform a “Point in Time” restore, click Point in Time. The Point in Time Restore dialog appears. Specify the date and time of the last restored transaction to be applied to the database. Click OK. The Point in Time Restore dialog closes.

   - If you want to avoid overwriting the source volumes, or if you are restoring a single database from a VSS Backup that resides on local VSS shadow volumes that contain multiple SQL databases, make sure to select the **Disable VSS Instant Restore** option.

10. Click Restore. The Restore Progress dialog appears.

11. Click OK. The restore is complete.
VSS Restore considerations
Be aware of the following 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):

- If you plan to perform a VSS Restore of the master database, see Appendix E, "Restoring the master database," on page 215 for step-by-step instructions.
- A VSS Instant Restore overwrites the entire contents of the source volumes. However, you can avoid overwriting the source volumes by selecting the Disable VSS Instant Restore option. 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. It is recommended that the source volume contain only the SQL database.
- 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.
- 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 Gen 2 or SAN Volume Controller with space-efficient target volumes.

Restoring file groups and files (Legacy)

When you restore a database, the data which exists in the database is overwritten and is no longer available after the restore is complete. Restore Groups/Files allows you to restore databases or parts of databases from group, file, set, log and full Legacy backups.

Restoring parts of a database from a full Legacy backup is referred to as a partial restore. If you plan to apply either a log restore with point-in-time or a differential restore to a partially restored database, then consider one of these tasks:

1. Use the Restore Groups/Files tab to select and restore the full backup object.
   Make sure the Recovery option is not selected.
2. If you plan to apply a log restore with point-in-time, use the Restore Databases tab and the Point in Time... option to restore the log. Make sure the Recovery option is selected.
3. If you plan to apply a differential restore, use the Restore Databases tab to perform a differential restore. Make sure the Recovery option is selected.

Special selection propagation rules apply to the Restore Groups/Files tab control.

In this mode, only full, group, file, set, and log backups appear in the tree.

- Selecting a non-log backup N₀...
  - selects all log backups following N₀.
- Selecting a log backup L₀...
  - selects the prior non-log backup N₀.
  - selects all log backups following N₀.
- Clearing a non-log backup N₀...
  - clears all logs between N₀ and the next selected non-log backup N₁ if it exists, or clears all logs following N₀ if N₁ does not exist.
- Clearing a log backup L₀...
- clears all logs and non-log backups prior to \( L_0 \).
- clears all log backups following \( L_0 \) up to the next selected non-log backup if it exists, or clears all log backups following \( L_0 \).

Perform these steps to restore your SQL file groups and files:

1. Open the Data Protection for SQL GUI. If you are running Data Protection for SQL in a MSCS or VCS, you MUST invoke the GUI with the \( /sqlserver \) parameter from the Data Protection for SQL command line.
2. Click the Restore Groups/Files tab. The Restore Groups/Files view appears.
3. Check the Show Active and Inactive checkbox if you want to display inactive databases (that have not yet been deleted from the Tivoli Storage Manager inventory) in addition to active databases.
4. Click the plus sign in the tree view to the left of the SQL Server to which you want to restore a file group or file. The tree view expands to show the names of SQL Servers on that Tivoli Storage Manager node for which Data Protection for SQL backups exist.
5. Click the plus sign in the tree view to the left of the SQL Server that you want to work with. The tree expands again showing the names of databases backed up on the Tivoli Storage Manager server.
6. Click the plus sign in the tree view to the left of the database that you want to restore. The database expands to show the types of backups available for restore.
7. Click the selection box in the tree view to the left of the file group, file, or set that you want to restore. The selection box changes to show the objects that are now selected. Select at least one log backup to restore.
8. Select the desired Restore Options for your backup.
9. If you want to replace the existing database object with the file group or file you are about to restore, check the Replace box.
10. If you want only the database owner to access the database after it has been restored, check the Database Owner Only box.
11. Click Restore
12. The Restore Progress dialog appears.
13. Click OK. The restore is complete.

**Restore options**

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

From either the Restore Databases tab or the Restore Groups/Files tab, you can select the following options.

**Show Active and Inactive**

By selecting this check box, you can include inactive backup objects in the tree and list. This allows you to easily specify inactive objects for restore purposes. The default is to display only active objects. When you first select this option, Data Protection for SQL does the following:

1. Issues a query of Tivoli Storage Manager for both active and inactive objects.
2. Clears the tree of any selections.
3. Puts the tree in its initial state after the query.
Stripes
You can specify the number of data stripes to use in a restore operation. A maximum of 64 data stripes is allowed. The default value is 1. Be certain that this corresponds to the value set for SQL buffers. Note that this option is always enabled for Legacy operations. However, stripes are not available for VSS operations.

Replace
You can replace a database during a restore by selecting the check box. The default is not to replace databases. This option is always enabled and applies to Legacy restores only.

Recovery
If you select several objects for restore in the GUI (e.g. full, difffull, log, log) and leave this option selected, Data Protection for SQL will make sure that SQL administers the recovery option only on the last backup object for each database being restored. This option is selected by default, but you can clear this checkbox when needed.

Database Owner Only
You can mark a database for owner use only after a restore by selecting the check box. The default is not to mark for owner use. This option is always enabled and applies to Legacy restores only.

Wait for Tape Mounts for Restore
You can specify whether or not the Data Protection for SQL restore operation waits for the Tivoli Storage Manager server to mount removable media such as tapes or CDs. This information is retrieved from Tivoli Storage Manager when you press the plus (+) icon on the backup object to expand the tree.

Wait for Tape Mounts for File Information
When querying Tivoli Storage Manager for file information, you can specify whether or not Data Protection for SQL waits for the Tivoli Storage Manager server to mount removable media. This option is not selected by default and applies to Legacy restores only.

From the Restore Databases tab only, the following additional options are available:

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

Point in Time Dialog
Clicking on the Point in Time button displays a dialog box with the following options:
• No point in time
• Stop at
• Stop at mark
• Stop before mark

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

To clear a point in time that is set, select the No point in time radio button.
When **point in time** is in use, a static field is enabled to display the results of the action.

**Disable VSS Instant Restore**

Selecting **Disable VSS Instant Restore** bypasses volume-level copy and uses file-level copy to restore the files from a local VSS Backup. If this option is not selected, volume level snapshot restore is used for local VSS Backups if the backup exists on volumes that support it. The default value is to use volume level snapshot restore if supported. This option is available for VSS operations only. When performing VSS Instant Restores, a best practice is to make sure that any previous background copies (that involve the volumes being restored) are completed prior to initiating the VSS Instant Restore. However, this check is not necessary for XIV Gen 2 or SAN Volume Controller with space-efficient target volumes. The **Disable VSS Instant Restore** option is only available when IBM Tivoli Storage FlashCopy Manager or the IBM Tivoli Storage Manager for Copy Services Microsoft SQL VSS Integration Module and IBM Tivoli Storage Manager for Copy Services Hardware Devices Snapshot Integration Module are installed.

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

**Restore Into**

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

**Relocate**

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

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

**Standby Server Undo File**

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

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

**Restore tree**

Aside from common tree characteristics already discussed, the following applies
uniquely to trees in both the **Restore Databases** and **Restore Groups/Files**
windows.

- When a SQL server or database is highlighted, a list of backup objects on the
  Tivoli Storage Manager server is displayed in the list control.
- The list displays information about the backup objects. For details, see “Restore
  list.”
- Backup objects display in ascending order of backup date (latest last).

In the **Restore Groups/Files** window, you can expand backup objects in the tree.
When you highlight an object, a list of groups contained in the backup is displayed
if you have first expanded the backup object. When you highlight a group, a list of
files is displayed.

**Restore list**

When you highlight a database object for a restore operation, the list control
displays the following information for a backup object:

- Backup Type
- Backup Method
- Backup Location
- Management Class
- State (Active/Inactive)
- Backup Object Creation Date and Time
- Backup Size
- Data Stripes (Legacy only)
- MSCS Cluster (Legacy only)
- Backup Object Identifier

From the **Restore Databases** tab, you can display the following additional
information about a specific Legacy backup by highlighting it in the tree:

- Data Space Allocated
- Data Space Used
- Log Space Allocated
- Log Space Used
- Data Protection for SQL Version
- SQL Server Version
Inactivating SQL databases (Legacy only)

This function allows SQL database backup objects to be inactivated on the Tivoli Storage Manager server and then participate in Tivoli Storage Manager expiration processing. Typical backups do not require this command as Tivoli Storage Manager performs inactivation as a part of Tivoli Storage Manager policy management. As a result, backup objects are typically inactivated as part of the scheduled backup processing. Data Protection for SQL:

1. Starts a session with a Tivoli Storage Manager server.
2. Marks the specified object inactive.
3. Ends the Tivoli Storage Manager session.

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

The inactivate window allows you to inactivate any active backups on the Tivoli Storage Manager server. To inactivate backup objects:

1. Open the View menu and click Inactivate.
   - The Inactivate page is added to the tab control and displays the inactivate tree and list when you click on the tab.
2. Select backup objects for inactivation.
3. Click the Inactivate button to begin the operation.
Inactivate tree and list

The inactivate tree is identical to the tree in the Restore Databases window, and the inactivate list is similar to the Restore Databases list.
Chapter 5. Command line interface

This chapter describes how to use the Data Protection for SQL command line interface (CLI), including syntax diagrams and sample command output.

The name of the Data Protection for SQL command line interface is `tdpsqlc.exe`. This executable is located in the directory where Data Protection for SQL is installed.

Data Protection for SQL uses the following command line syntax:

```
tdpsqlc <command> <positional parameter> <0 or more optional parameters>
```

The `tdpsqlc` executable is followed by high level operations called `commands`. Each command accepts various command line parameters. These parameters consist of `positional parameters` and `optional parameters`. Positional parameters must precede other options in the command line. In the following case, the backup command with its database name `xyz`, the object to back up, is followed by the type of backup, `full`, a positional parameter, and finally by an optional parameter, `/sqlbuffers`.

```
tdpsqlc backup xyz full /sqlbuffers=2
```

For output samples of the Data Protection for SQL commands illustrating various positional and optional parameters, see the "Output Examples" section following each command's syntax.

**Note:** You can display a complete list of Data Protection for SQL commands and all their parameters by simply entering `tdpsqlc` or the `tdpsqlc help|?` command. See "Help command" on page 173.

### Available commands

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backup</td>
<td>Backs up all or part of one or more SQL databases to Tivoli Storage Manager server.</td>
<td>&quot;Backup command&quot; on page 86</td>
</tr>
<tr>
<td>Query</td>
<td>Displays information about servers, databases, backup objects, and Data Protection for SQL configuration.</td>
<td>&quot;Query command&quot; on page 109</td>
</tr>
<tr>
<td>Restore</td>
<td>Restores all or part of one or more SQL databases to SQL server.</td>
<td>&quot;Restore command&quot; on page 132</td>
</tr>
<tr>
<td>INACTIVATE</td>
<td>Inactivates one or more active backup objects on the Tivoli Storage Manager server.</td>
<td>&quot;Inactivate command (Legacy only)&quot; on page 166</td>
</tr>
<tr>
<td>Help</td>
<td>Displays the syntax of Data Protection for SQL commands.</td>
<td>&quot;Help command&quot; on page 173</td>
</tr>
<tr>
<td>Set</td>
<td>Changes the values of configuration parameters.</td>
<td>&quot;Set command&quot; on page 177</td>
</tr>
<tr>
<td>CHANGETSMPassword</td>
<td>Changes the Tivoli Storage Manager password used by Data Protection for SQL.</td>
<td>&quot;Changetsmpassword command&quot; on page 185</td>
</tr>
</tbody>
</table>
Command line parameter characteristics

As seen in the preceding command line syntax, there are several characteristics to take note of in the Data Protection for SQL command line:

- Do not include a slash or dash before positional parameters.
- Begin optional parameters with a forward slash (/) or a dash (-).
- You may place multiple optional parameters per command invocation in any order after positional parameters.
- You may abbreviate keywords. Minimum abbreviations are indicated in upper case in the syntax diagrams.
- All SQL names of databases or parts of databases are case-sensitive.
- Separate parameters with at least one space.
- Some keyword parameters may require a value; separate values from their keywords with an equal sign (=).
- If a parameter’s value includes spaces or special characters, enclose the value in double quotes.
- You can use most positional and optional parameters only once per command invocation. The following exceptions allow lists of values or repetition of the parameter:
  - File=
  - Group=
  - Log=
  - Set=
  - /Files=
  - /Groups=
  - /RELocate=
  - /TO=

For example: /files=a,b or /files=a/files=b

Note: Multiple instances of optional parameters do not have to be contiguous. For example: /files=a /groups=y /files=b /groups=z

Where repeatable syntax appears, separate multiple values with commas as indicated in the following:

Use the wildcard asterisk (*) following the command to select all instances on the server of database names or file names.

For help in reading syntax diagrams, refer to “Reading syntax diagrams” on page xxiii.
Data Protection for SQL parameters available by backup method

Table 18. Data Protection for SQL optional parameters

<table>
<thead>
<tr>
<th>Optional Parameters</th>
<th>Legacy</th>
<th>VSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>/ACTIVE</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/ADJUSTKBtsmestimate</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/ADJUSTPERcentsmestimate</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/ALL</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/BACKUPDESTination</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/BACKUPMETHOD</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/BUFFers</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/BUFFERSIZE</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/COMPATibilityinfo</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/CONFIGfile</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/DBOonly</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/DIFFESTimate</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/EXCLUDEDB</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/FILEInfo</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/Files</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/FROMSQLSERVER</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/GROUPs</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/INSTANTRestore</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>/INTO</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/LOGESTimate</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/LOGFile</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/LOGPrune</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/MOUNTWait</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/OBJect</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/OFFLOAD</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>/OLDERthan</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/PARTial</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/Quiet</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/RECOVery</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/RELOCATEDir</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/RELocate /TO</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/REPlace</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/SQLAUTHentication</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/SQLBUFFers</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/SQLBUFFERSIZE</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/SQLPassword</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/SQLSERVER</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Table 18. Data Protection for SQL optional parameters (continued)

<table>
<thead>
<tr>
<th>Optional Parameters</th>
<th>Legacy</th>
<th>VSS</th>
</tr>
</thead>
<tbody>
<tr>
<td>/SQLUser</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/STANDBy</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/STOPAT</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/STOPATMark /AFTER</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/STOPBEFOREMark /AFTER</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/STRIPes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/TRUNCate</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>/TSMNODE</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/TSMOPTFile</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>/TSMPassword</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Data Protection for SQL allows you to perform online backups and restores of Microsoft SQL Server databases to Tivoli Storage Manager server storage using either command-line or graphical user interfaces (GUI).

Backup command

Use the **backup** command to back up all or part of one or more SQL databases from the SQL Server to Tivoli Storage Manager storage on the Tivoli Storage Manager server.

You can enter the * character to backup all databases. You can specify more than one database at once for multiple database and transaction log backups.

**Considerations:**

- Simple recovery model databases are automatically excluded from log backups.
- The master database is automatically excluded from log and differential backups.
- You cannot back up or restore the **tempdb** database because it is created by SQL server each time the server is started.
- Although full and differential backups include a part of the transaction log, that part is only what is required to make a restore consistent. It is not a log backup and does not truncate the log.
- The user id used by Data Protection for SQL to log on to the SQL server must have the SQL Server SYSADMIN fixed server role.
- You can use the `TRANSACT-SQL` database consistency checker statement `DBCC CHECKDB('DBNAME')` to verify the integrity of the SQL databases before you back them up.
Backup syntax

Use the **backup** command syntax diagrams as a reference to view available options and truncation requirements.

Backup Optional Parameters:

```
/ADJUSTKBtmsestimate=numkb
/ADJUSTPERcenttmsestimate=numpercent
/BACKUPDESTination=LOCAL
/BACKUPDESTination=BOTH
/BACKUPDESTination=TSM
/BACKUPDESTination=LEGACY
/BACKUPDESTination=VSS
/BUFFers=numbuffers
/BUFFersSize=buffersizeinkb
/CONFIGfile=tdpsql.cfg
/CONFIGfile=configfilename
/LOGFile=tdpsql.log
/LOGFile=logfilename
/EXCLUDEdb=db-name,...
```
Backup positional parameters

Positional parameters immediately follow the `backup` command and precede the optional parameters.

**FILE=*logicalfilename,...**

A file backup contains only the contents of the SQL server logical file you specify. You can use this option when it is not practical to back up an entire SQL database due to available backup time and space or due to performance requirements. The `logicalfilename` variable specifies the names of the SQL server database logical files you want to back up or restore to.

**Considerations:**

- You should follow file backups with transaction log backups for all SQL databases you back up.
- You can specify this parameter more than once per command invocation.
- A new backup object inactivates any active backup object of the same name in the same SQL database.
- Use * as a wildcard character in `logicalfilename` to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all logical files in the SQL server database.

**Note:** Since each logical file backed up creates a separate backup object on the Tivoli Storage Manager server, specifying only the wildcard character results in a separate backup object for each logical file in the SQL server database.

- If `logicalfilename` includes spaces or special characters, enclose it in double quotes.
- The `logicalfilename` variable is case-sensitive.
- You cannot specify the `recovery` parameter with `restore file` operations.
- A SQL server Create Index operation requires that you back up all affected file groups as a unit. You cannot back up a file in the affected file groups until you perform the unit backup. A SQL server error
message will indicate which file groups are affected. You must perform a full database backup or a set backup of at least the affected file groups before the file backup succeeds.

FULL A full Legacy database backup contains all of the contents of a SQL server database plus enough of the database’s transaction log to make a restore consistent. A full VSS database backup contains all of the contents of a SQL server database (database files, log files, and full-text index files).

Each SQL database backed up using the Legacy backup method creates a separate backup object on the Tivoli Storage Manager server. A new full database backup object inactivates all prior Legacy active backup objects for the same SQL database. This inactivation includes any active full backup object as well as any active file, group, set, differential, and log backup objects. For additional policy information, including VSS aspects, see “How Tivoli Storage Manager server policy affects Data Protection for SQL” on page 19, “Management Class” on page 47, and “Setting automatic expiration (VSS and Legacy)” on page 55.

DiffFull

A diffFull (differential) database backup contains only the parts of a SQL server database changed since the latest full backup plus enough of the SQL database’s transaction log to make a restore consistent. As such, a differential backup usually takes up less space than a full backup. Use this option so that all individual log backups since the last full database backup do not need to be applied.

Groups=

A group backup contains only the contents of the SQL server file group you specify. A group backup is useful when selected SQL database table or indexes have been assigned to a file group and only those tables or indexes need backing up. Specifically:

• You can save backup time by not backing up other tables or indexes in the SQL database that do not change as often.
• You can save restore time if, for example, the file group is on a different volume from the rest of the SQL database’s file groups and that volume needs to be restored. You need restore only that file group for that SQL database.

The groupName variable specifies the names of the SQL server database file groups you want to back up.

Considerations:

• You can specify this parameter more than once per command invocation.
• A new group backup object inactivates any active group backup object of the same name in the same SQL database.
• Use * as a wildcard character in the groupName variable to replace zero or more characters for each occurrence.
• Specifying only the wildcard character indicates all file groups in the SQL server database.

Note: Since each group backed up creates a separate backup object on the Tivoli Storage Manager server, specifying only the wildcard character results in a separate backup object for each file group in the SQL server database.

• If the groupName variable includes spaces or special characters, enclose it in double quotes.
• The **`groupname`** variable is case-sensitive.

• You should follow group backups with transaction log backups for all SQL databases you back up.

• You cannot perform group backups for the following SQL databases:
  - Those with the SQL Server attribute TRUNCATE LOG ON CHECKPOINT.
  - Those using the SIMPLE recovery model.

• You cannot specify the `recovery` parameter with **`restore group`** operations.

• A SQL Server Create Index operation requires that you back up all affected file groups as a unit. You cannot back up a single file group of the affected file groups until you perform the unit backup. A SQL Server error message will indicate which file groups are affected. You must perform a full database backup or a set backup of at least the affected file groups before the group backup succeeds.

**Log or Log=*|logobjectname,...**

A log backup contains the contents of the transaction log for an active SQL server database since the latest successful log backup. This option can save backup time by requiring fewer SQL database backups. For **`backup`** operations, **`log`** takes no values. Use * as a wildcard character in **`logobjectname`** to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all log backup objects for the SQL databases.

**Considerations:**

• You can control the size of a transaction log by allowing a log backup to truncate the inactive part of the transaction log. This is the default.

• By using the `/truncate=no` parameter, you may be able to backup the transaction log of a damaged, suspect, or unrecovered SQL Server database.

• Each log backed up creates a separate backup object with a unique name on the Tivoli Storage Manager server. A new log backup object does **not** inactivate any active backup objects (unlike the other backup types except **`set`** backups). Log backup objects do not participate in Tivoli Storage Manager server automatic expiration processing except when full database backup objects inactivate all active backup objects for a SQL database. Therefore, you can inactivate log backup objects using the **`inactivate`** command if full database backups are not performed frequently or at all.

• You cannot perform log backups for the following SQL databases:
  - Those with the SQL Server attribute TRUNCATE LOG ON CHECKPOINT.
  - Those using the SIMPLE recovery model.

**Set or Set=*|setobjectname,...**

A **`set`** backup contains the contents of the SQL server file groups and files you specify with the `/files` and `/groups` parameters. For **`backup`** operations, **`set`** takes no values. Use * as a wildcard character in **`setobjectname`** to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all set backup objects for the SQL databases.

**Considerations:**

• Use this option for unusual circumstances or special, one-time backups. One such case is when SQL Server requires that certain file groups be
backed up as a unit and a full database backup is not practical. See the description of the file, and group parameters in this section, specifically in reference to the Create Index operation.

- Each SQL database backed up creates a separate backup object on the Tivoli Storage Manager server. All of the files and file groups backed up as part of a set backup for the same SQL server database are contained in a single backup object. Note that this is different from group and file backups, which create a separate backup object of each file and file group even if they are part of the same SQL server database.

- A new set backup object does not inactivate any active backup objects (unlike the other backup types except log backups). Set backup objects do not participate in Tivoli Storage Manager server automatic expiration processing except when full database backup objects inactivate all active backup objects for a SQL database. Therefore, you can inactivate set backup objects using the inactivate command if full database backups are not performed or not performed frequently.

- You should follow set backups with transaction log backups for all SQL databases you back up.

- The file, group, log, and set parameters can take a list of values (repeatable syntax) and may be specified more than once. For example: file=a,b or file=a file=b

- Multiple instances of optional parameters do not have to be contiguous. For example: file=a group=y file=b group=z

### Backup optional parameters

Optional parameters follow the backup command and positional parameters.

/ADJUSTKBtsmestimate=numkb

The /adjustkbtsmestimate parameter specifies the number of kilobytes to add to the size of the backup estimate generated by the SQL Server. The numkb variable refers to the number of kilobytes to add. The number can range from 0 to 9999. The default is 0. Increasing the number of kilobytes may be necessary when the backup estimate (generated by the SQL Server) may be too low as the disk storage pool has cache enabled. For example, if maintenance is performed on the production server during a Data Protection for SQL backup, the size of transaction logs can increase beyond the original backup estimate and cause the backup to fail. Use this parameter to customize the number of kilobytes in the backup estimate and avoid possible backup failures.

/ADJUSTPERcenttsmestimate=numpercent

The /adjustpercenttsmestimate parameter specifies the percentage number to add to the size of the backup estimate. The numpercent variable refers to the percentage number to add. The number can range from 0 to 99. The default is 0. Increasing the percentage estimate may be necessary when the backup estimate (generated by the SQL Server) may be too low as the disk storage pool has cache enabled. For example, if maintenance is performed on the production server during a Data Protection for SQL backup, the size of transaction logs can increase beyond the original backup estimate and cause the backup to fail. Use this parameter to customize the percentage in the backup estimate and avoid possible backup failures.

/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.

**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 SQL streaming backup and restore API as used in previous versions of Data Protection for SQL. This is the default.

**VSS**  The backup is performed with VSS.

`/BUFFERS=numbuffers`

The `/buffers` parameter specifies the number of data buffers used for each data stripe to transfer data between Data Protection for SQL and the Tivoli Storage Manager API. The `numbuffers` variable refers to the number of data buffers to use. The number can range from 2 to 8. The default is 3.

**Considerations:**
- You can improve throughput by increasing the number of buffers, but you will also increase storage use. Each buffer is the size specified in the `/buffersize` parameter.
- The default value is the value specified by the buffers configurable option in the Data Protection for SQL configuration file. This is initially 3.
- If you specify `/buffers`, its value is used instead of the value stored in the Data Protection for SQL configuration file. Specifying this parameter does not change the value in the configuration file.
- If you specify `/buffers` but not `numbuffers`, the default value 3 is used.

`/BUFFERSIZE=buffersizeinkb`

The `/buffersize` parameter specifies the size of each Data Protection for SQL buffer specified by the `/buffers` parameter. The `buffersizeinkb` variable refers to the size of data buffers in kilobytes. The number can range from 64 to 8192. The default is 1024.

**Considerations:**
- Though increasing the number of buffers can improve throughput, it also increases storage use as determined by this parameter.
- The default value is the value specified by the buffers configurable option in the Data Protection for SQL configuration file. This is initially 1024.
- If you specify `/buffersize`, its value is used instead of the value stored in the Data Protection for SQL configuration file. Specifying this parameter does not change the value in the configuration file.
If you specify /buffersize but not buffersizeinkb, the default value 1024 is used.

/CONFIGfile=FILENAME
The /configfile parameter specifies the name of the Data Protection for SQL configuration file, which contains the values for the Data Protection for SQL configurable options. See "Set command" on page 177 for details on the file's contents.

Considerations:
- configfilename can include a fully qualified path. If configfilename does not include a path, it uses the directory where Data Protection for SQL is installed.
- If configfilename includes spaces, place it in double quotes.
- If you do not specify /configfile, the default value is tdpsql.cfg.

/EXCLUDEdb=DBNAME,...
The /excludedb parameter specifies the name of the databases to exclude from the backup operation. This parameter is available for all VSS and Legacy backup types.

/LOGFile=FILENAME
The /logfile parameter specifies the name of the activity log that is generated by Data Protection for SQL. This activity log records significant events such as completed commands and error messages. The Data Protection for SQL activity log is distinct from the SQL Server error log. The logfile variable identifies the name to be used for the activity log generated by Data Protection for SQL.

Considerations:
- If the specified file does not exist, it is created. If it does exist, new log entries are appended to the file.
- The file name can include a fully-qualified path; however, if you specify no path, the file is written to the directory where Data Protection for SQL is installed.
- You cannot turn Data Protection for SQL activity logging off. If you do not specify /logfile, log records are written to the default log file. The default log file is tdpsql.log.
- When using multiple simultaneous instances of Data Protection for SQL to perform operations, use the /logfile parameter to specify a different log file for each instance used. This directs logging for each instance to a different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.

/LOGPrune=numdays | No
The /logprune parameter prunes the Data Protection for SQL activity log and specifies how many days of entries are saved. By default, log pruning is enabled and performed once each day Data Protection for SQL is executed; however, this option allows you to disable log pruning or explicitly request a prune of the log for one command run even if the log file has already been pruned for the day. The numdays variable represents the number of days to save log entries. By default, 60 days of log entries are saved in the prune process.

Considerations:
If you specify `numdays`, it can range from 0 to 9999. A value of 0 deletes all entries in the Data Protection for SQL activity log file except for the current command entries.

If you specify `/logprune`, its value is used instead of the value stored in the Data Protection for SQL configuration file. Specifying this parameter does not change the value in the configuration file.

Changes to the value of the `timeformat` or `dateformat` parameter can result in an undesired pruning of the Data Protection for SQL log file. If you are running a command that may prune the log file and the value of the `timeformat` or `dateformat` parameter has changed, perform one of the following to prevent undesired pruning of the log file:

- Make a copy of the existing log file.
- Specify a new log file with the `/logfile` parameter or `logfile` setting.

/MOUNTWait=Yes | No
If the Tivoli Storage Manager server is configured to store backup data on removable media such as tapes or optical media, it is possible that the Tivoli Storage Manager server may indicate to Data Protection for SQL that it is waiting for a required storage volume to be mounted. If that occurs, this option allows you to specify whether to wait for the media mount or stop the current operation. You can specify:

Yes Wait for tape mounts (default).
No Do not wait for tape mounts.

Considerations:
- If you use data striping for Legacy operations, Data Protection for SQL cannot complete waiting until the initial media for all stripes are available, although Data Protection for SQL starts to use each stripe as its media becomes available. Because of the way SQL Server distributes data among stripes, if any stripe does not have its media available, each of the stripes may eventually be either waiting for its own or another stripe’s media to become available. In this case, it may become necessary to terminate the Data Protection for SQL command from a prolonged wait. This can be done only by terminating the Data Protection for SQL program (close the command prompt window or enter `control-c`).
- If the management class for meta objects also requires removable media, Data Protection for SQL waits for that volume, but because meta objects are not created until after the data objects are complete, the wait occurs after all of the data is transferred.
- If you specify `no` and any removable media are required, Data Protection for SQL terminates the command with an error message. This is also true if the management class for meta objects requires removable media. Since the meta objects are not created until after the data objects are complete, the command termination does not occur until after all of the database data is transferred.
- If you do not specify `/mountwait`, the default value is that specified in the mountwait configurable option in the Data Protection for SQL configuration file. This is initially `yes`. Specifying this parameter does not change the value in the configuration file.

/OFFLOAD
Specify this parameter to perform the 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.

/SQLAUTHentication=INTEGRATED | SQLuserid
This parameter specifies the authorization mode used when logging on to the SQL server. The integrated value specifies Windows authentication. The user id you use to log on to Windows is the same id you will use to log on to the SQL server. This is the default value.

Use the sqluserid value to specify SQL Server user id authorization. The user id specified by the /sqluserid parameter is the id you will use to log on to the SQL server. Any SQL user id must have the SQL Server SYSADMIN fixed server role.

/SQLBUFFERS=numsqlbuffers
The /sqlbuffers parameter specifies the total number of data buffers SQL Server uses to transfer data between SQL Server and Data Protection for SQL. The numsqlbuffers variable refers to the number of data buffers to use. The number can range from 0 to 999. The initial value is 0. When /sqlbuffers is set to 0, SQL determines how many buffers should be used.

Considerations:
• The default value is the value specified by the SQL buffers configurable option in the Data Protection for SQL configuration file. This is initially 0.
• If you specify /sqlbuffers, its value is used instead of the value stored in the Data Protection for SQL configuration file. Specifying this parameter does not change the value in the configuration file.
• If you specify /sqlbuffers but not numsqlbuffers, the default value 0 is used.

/SQLBUFFERSIZE=sqlbuffersizeinkb
The /sqlbuffersize parameter specifies the size of each buffer (specified by the /sqlbuffers parameter) SQL Server uses to transfer data to Data Protection for SQL. The sqlbuffersizeinkb variable refers to the size of data buffers in kilobytes. The number can range from 64 to 4096. The default is 1024.

Considerations:
• The default value is the value specified by the SQL buffers configurable option in the Data Protection for SQL configuration file. This is initially 1024.
• If you specify /sqlbuffersize, its value is used instead of the value stored in the Data Protection for SQL configuration file. Specifying this parameter does not change the value in the configuration file.
• If you specify /sqlbuffersize but not sqlbuffersizeinkb, the default value 1024 is used.

/SQLPassword=sqlpasswordname
This parameter specifies the SQL password that Data Protection for SQL uses to log on to the SQL server that objects are backed up from or restored to.

Considerations:
• Using this parameter means that you are using SQL Server authentication. The SQL Server and the SQL user id for this password must both be configured for SQL Server authentication.
• If you do not specify /sqlpassword, the default value is blank (" ").
If you specify /sqlpassword but not sqlpasswordname, the default is also blank (" ").
This parameter is ignored if you use the /sqlauth=integrated parameter with it.

/SQLSERVER=sqlprotocol:sqlservername
The /sqlserver parameter specifies the SQL server that Data Protection for SQL logs on to. The sqlprotocol variable specifies the communication protocol to use. You can specify one of the following protocols:
- lpc: Use Shared Memory protocol.
- np: Use Named Pipes protocol.
- tcp: Use Transmission Control protocol.
- via: Use Virtual Interface Architecture protocol.
If no protocol is specified, Data Protection for SQL logs on to the SQL server according to the first protocol that becomes available.

Considerations:
- The default value is the value specified by the SQL server configurable option in the Data Protection for SQL configuration file. This is initially the local computer name.
- If you specify /sqlserver but not sqlservername, the local computer name is used.
- The following two shortcuts are accepted as the local computer name: . (local) These are a period or the word local within parentheses.
- If the SQL server is a member of a fail-over cluster, the CLUSTERNODE option in the Tivoli Storage Manager options file must have the value YES.
- You must specify the name if the SQL server is not the default instance or is a member of a fail-over cluster.
- The format of sqlservername depends on what type of instance it is and whether it is clustered or not:

<table>
<thead>
<tr>
<th>Format</th>
<th>Instance?</th>
<th>Clustered?</th>
<th>Name required?</th>
</tr>
</thead>
<tbody>
<tr>
<td>local-computername</td>
<td>default</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>local-computername\instancename</td>
<td>named</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>virtualservername</td>
<td>default</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>virtualservername\instancename</td>
<td>named</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

localcomputername
The network computer name of the computer the SQL server and Data Protection for SQL reside on. The TCP/IP host name may not always be the same.

instancename
The name given to the named instance of SQL Server specified during installation of the instance.

virtualservername
The name given to the clustered SQL Server specified during clustering service setup. This is not the cluster or node name.
/SQLUSer=squsername
The /sqluser parameter specifies the name that Data Protection for SQL uses to log on to the SQL server.

Considerations:
- Using this parameter means that you are using SQL Server authentication. The SQL Server and the SQL user id for this password must both be configured for SQL Server authentication.
- The SQL user id must have the SQL server SYSADMIN fixed server role.
- If you do not specify /sqluser, the default is sa.
- If you specify /sqluser but not squsername, the default is also sa.
- This parameter is ignored if you use the /sqlauth=integrated parameter with it.

/STRIPes=numstripes
The /stripes parameter specifies the number of data stripes to use in a backup or restore operation. The numstripes variable can range from 1 to 64.

Considerations:
- If you do not specify /stripes, the default value is that specified in the Data Protection for SQL configuration file. The initial value is 1.
- If you specify /stripes but not numstripes, the stored value is used.
- You may use up to the number used to create the backup. You can determine the number of data stripes used to create a backup object with the Data Protection for SQL command: query tsm dbname backup_object
- You must use the MAXNUMMP parameter on a Tivoli Storage Manager REGISTER NODE or UPDATE NODE command to allow a node to use multiple sessions to store data on removable media (which requires you to allocate multiple mount points to that node). The MAXNUMMP value must be equal to or less than the maximum number of stripes you desire.
- When you use data striping, you should use Tivoli Storage Manager server file space collocation to try to keep each stripe on a different storage volume.
- The maximum number of data stripes you can use is one less than the value of the Tivoli Storage Manager server TXNGROUPMAX option in the dsmserc.opt file.

/TSMNODE=tsmnodename
The /tsmnode parameter specifies the Tivoli Storage Manager node name that Data Protection for SQL uses to log on to the Tivoli Storage Manager server. This identifies which Tivoli Storage Manager client is requesting services. You can also store the node name in the options file. The command line parameter overrides the value in the options file.

Considerations:
- You cannot use the /tsmnode parameter if PASSWORDACCESS GENERATE is specified in the Tivoli Storage Manager options file. You must specify the nodename in the options file. Otherwise, you can change PASSWORDACCESS to PROMPT to utilize the /tsmnode parameter. For details about the Tivoli Storage Manager options file, see the reference manual IBM Tivoli Storage Manager for Windows Backup-Archive Client Installation and User’s Guide.
• If you do not specify /tsmnode, the default value is that specified by the
node option in the Tivoli Storage Manager options file. Specifying
this parameter does not change the value in the options file.

/TSMOPTFile=dsmoptfilename
The /tsopt parameter specifies the Tivoli Storage Manager options file
to use. This is similar to selecting a Tivoli Storage Manager server from the
server list in the GUI. The Tivoli Storage Manager options file contains the
configuration values for the Tivoli Storage Manager API. For details about
the Tivoli Storage Manager options file, see the reference manual IBM
Tivoli Storage Manager for Windows Backup-Archive Client Installation and
User’s Guide.

Considerations:
• The tsoptname variable can include a fully qualified path. If you do
not include a path, the directory where Data Protection for SQL is
installed is used.
• If tsoptname includes spaces, you must enclose it in double quotes.
• If you do not specify /tsopt, the default value is dsm.opt.
• If you specify /tsopt but not tsoptname, the default is also
dsm.opt.

/TSMPassword=tsmpasswordname
The /tsmpassword parameter specifies the Tivoli Storage Manager
password that Data Protection for SQL uses to log on to the Tivoli Storage
Manager server. This parameter and the option PASSWORDACCESS in the
Tivoli Storage Manager options file interact in the following ways:

<table>
<thead>
<tr>
<th>/tsmpassword</th>
<th>PASSWORDACCESS in Tivoli Storage Manager options file</th>
<th>Password already stored in registry?</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>specified</td>
<td>generate</td>
<td>yes</td>
<td>/tsmpassword ignored</td>
</tr>
<tr>
<td>specified</td>
<td>generate</td>
<td>no</td>
<td>/tsmpassword used and stored</td>
</tr>
<tr>
<td>specified</td>
<td>prompt</td>
<td>—</td>
<td>/tsmpassword used</td>
</tr>
<tr>
<td>not specified</td>
<td>prompt</td>
<td>—</td>
<td>user is prompted</td>
</tr>
</tbody>
</table>

Legacy Backup output examples
These output examples provide a sample of the text, messages, and process status
that displays when using the backup command.

Legacy Backup 1: full
Legacy Backup 1 performs a Legacy full backup of two databases, model and msdb,
to Tivoli Storage Manager server storage. Two optional parameters, /sqlbuffers and
/stripes, are included.

Command:
    tdsq1c backup model,msdb full /sqlbuffers=2 /stripes=2

Output:
Legacy Backup 2: full

Legacy Backup 2 performs a Legacy full backup of the test2 database with no output due to the /quiet parameter. In addition, the default Windows authentication mode has been overridden by /sqlauth=sql.

Command:
```
tdpsqlc backup test2 full /quiet /sqlauth=sql
```

Output:

```plaintext
100
```

Legacy Backup 3: differential

Legacy Backup 3 performs a Legacy differential backup of the previous full backup of the test2 database. An estimate of the changed portion of test2 is included.

Command:
```
tdpsqlc backup test2 difffull /diffest=10
```

Output:
Starting SQL database backup...

Beginning diffull backup for database test2, 1 of 1.
Full: 0  Read: 5341016  Written: 5341016  Rate: 1,120.96 Kb/Sec

Backup of test2 completed successfully.

Total SQL backups selected: 1
Total SQL backups attempted: 1
Total SQL backups completed: 1
Total SQL backups excluded: 0
Throughput rate: 1,120.24 Kb/Sec
Total bytes transferred: 5,341,016
Elapsed processing time: 4.66 Secs

Note: Differential backup objects are denoted as "diffull" in CLI output and in the GUI tree and list.

Legacy Backup 4: log

Legacy Backup 4 performs a Legacy log backup of the previous full backups of test2 and model. The default to truncate the logs is overridden.

Command:
```
tdpsqlc backup test2,model log /truncate=no
```

Output:

Starting SQL database backup...

Beginning log backup for database model, 1 of 2.
Full: 0  Read: 80656  Written: 80656  Rate: 67.55 Kb/Sec

Backup of model completed successfully.

Beginning log backup for database test2, 2 of 2.
Full: 0  Read: 88920  Written: 88920  Rate: 73.28 Kb/Sec

Backup of test2 completed successfully.

Total SQL backups selected: 2
Total SQL backups attempted: 2
Total SQL backups completed: 2
Total SQL backups excluded: 0
Throughput rate: 70.44 Kb/Sec
Total bytes transferred: 169,576
Elapsed processing time: 2.35 Secs

Legacy Backup 5: group

Legacy Backup 5 performs a Legacy backup of all file groups belonging to the netapp_db2 database.

Command:
tdpsqlc backup netapp_db2 Group**

Output:

IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Connecting to SQL Server, please wait...

Starting SQL database backup...

Connecting to TSM Server as node 'TREEL0_SQL'...

Beginning group backup for database netapp_db2, 1 of 1.
Full: 0  Read: 2182784  Written: 2182784  Rate: 2,135.90 Kb/Sec
Backup of netapp_db2 completed successfully.

Total SQL backups selected: 1
Total SQL backups attempted: 1
Total SQL backups completed: 1
Total SQL backups excluded: 0

Throughput rate: 2,114.71 Kb/Sec
Total bytes transferred: 2,182,784
Elapsed processing time: 1.01 Secs

Legacy Backup 6: file

Legacy Backup 6 performs a Legacy file backup of all files belonging to test2 using the wildcard character (*). This consists of three files within two groups within one database.

Command:

    tdpsqlc backup test2 file**

Output:
Legacy Backup 7: set

Legacy Backup 7 performs a Legacy set backup of one file group and two separate files (jointly as a single backup object) from the test2 database. The /groups and /files parameters specify which items constitute this set backup.

Command:

tdpsqlc backup test2 set /groups=primary /files=test2_2data, test2_3data

Output:

```
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Starting SQL database backup...

Beginning set backup for database test2, 1 of 1.
  Full: 0  Read: 14706896  Written: 14706896  Rate: 3,404.98 Kb/Sec
Backup of test2 completed successfully.

Total SQL backups selected: 1
Total SQL backups attempted: 1
Total SQL backups completed: 1
Total SQL backups excluded: 0
Throughput rate: 3,404.98 Kb/Sec
Total bytes transferred: 14,706,896
Elapsed processing time: 4.22 Secs
```
Legacy Backup 8 performs a Legacy differential backup of all available databases using the wildcard character (*). However, the new /excludedb parameter is used to exclude the master and msdb databases from being backed up.

**Command:**
```
tdpsqlc backup * difffull /excludedb=master,msdb
```

**Output:**
```
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Connecting to SQL Server, please wait...

Starting SQL database backup...

Connecting to TSM Server as node 'TREELO_SQL'...

Beginning difffull backup for database AdventureWorks, 1 of 5.
Full: 0  Read: 1140480  Written: 1140480  Rate: 904.02 Kb/Sec
Backup of AdventureWorks completed successfully.

Beginning difffull backup for database AdventureWorksDW, 2 of 5.
Full: 0  Read: 1135360  Written: 1135360  Rate: 1,447.45 Kb/Sec
Backup of AdventureWorksDW completed successfully.

Beginning difffull backup for database model, 3 of 5.
Full: 0  Read: 1050485  Written: 1050485  Rate: 801.04 Kb/Sec
Backup of model completed successfully.

Beginning difffull backup for database netapp_db1, 4 of 5.
Full: 0  Read: 1227360  Written: 1227360  Rate: 1,109.82 Kb/Sec
Backup of netapp_db1 completed successfully.

Beginning difffull backup for database test1, 5 of 5.
Full: 0  Read: 1135360  Written: 1135360  Rate: 1,447.45 Kb/Sec
Backup of test1 completed successfully.

Total SQL backups selected: 5
Total SQL backups attempted: 5
Total SQL backups completed: 5
Total SQL backups excluded: 2
Throughput rate: 267.22 Kb/Sec
Total bytes transferred: 5,689,045
Elapsed processing time: 8.32 Secs
```

Legacy Backup 9: full

Legacy Backup 9 performs a Legacy full backup of all available databases using the wildcard character (*). However, the new /excludedb parameter is used to exclude the master and msdb databases from being backed up.

**Command:**
```
tdpsqlc backup * full /excludedb=master,msdb
```

**Output:**
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Connecting to SQL Server, please wait...

Starting SQL database backup...

Connecting to TSM Server as node 'TREELO_SQL'...

Beginning full backup for database AdventureWorks, 1 of 8.
Full: 3 Read: 5242880 Written: 2097152 Rate: 1,912.23 Kb/Sec
Full: 3 Read: 16777216 Written: 13631488 Rate: 6,378.53 Kb/Sec
Backup of AdventureWorks completed successfully.

Beginning full backup for database AdventureWorksDW, 2 of 8.
Full: 3 Read: 7340032 Written: 4194304 Rate: 3,988.32 Kb/Sec
Full: 3 Read: 18874368 Written: 15728640 Rate: 7,522.04 Kb/Sec
Backup of AdventureWorksDW completed successfully.

Beginning full backup for database model, 3 of 8.
Full: 0 Read: 2189056 Written: 2189056 Rate: 2,081.55 Kb/Sec
Full: 0 Read: 2189056 Written: 2189056 Rate: 2,081.55 Kb/Sec
Backup of model completed successfully.

Beginning full backup for database netapp_db1, 4 of 8.
Full: 0 Read: 2184768 Written: 2184768 Rate: 3,208.36 Kb/Sec
Backup of netapp_db1 completed successfully.

Beginning full backup for database netapp_db2, 5 of 8.
Full: 0 Read: 2183936 Written: 2183936 Rate: 2,088.88 Kb/Sec
Backup of netapp_db2 completed successfully.

Beginning full backup for database ReportServer, 6 of 8.
Full: 0 Read: 3231488 Written: 3231488 Rate: 3,090.84 Kb/Sec
Full: 0 Read: 3231488 Written: 3231488 Rate: 2,012.61 Kb/Sec
Backup of ReportServer completed successfully.

Beginning full backup for database ReportServerTempDB, 7 of 8.
Full: 0 Read: 2182912 Written: 2182912 Rate: 2,087.90 Kb/Sec
Full: 0 Read: 2182912 Written: 2182912 Rate: 1,741.63 Kb/Sec
Backup of ReportServerTempDB completed successfully.

Beginning full backup for database test1, 8 of 8.
Full: 0 Read: 2183936 Written: 2183936 Rate: 2,780.64 Kb/Sec
Backup of test1 completed successfully.

Inactivating difffull backup model
Inactivating difffull backup test1

Total SQL backups selected: 10
Total SQL backups attempted: 8
Total SQL backups completed: 8
Total SQL backups excluded: 2
Total SQL backups inactivated: 2
Throughput rate: 8,712.39 Kb/Sec
Total bytes transferred: 260,748,224
Elapsed processing time: 29.23 Secs

Legacy Backup 10: full

Legacy Backup 10 performs a Legacy full backup of the test1 database. The new /adjustkbtsmestimate parameter is used to customize the number of kilobytes.

Command:
tdpsqlc backup test1 full /adjustkbtsmestimatem=25

Output:

IBM Tivoli Storage Manager for Databases: Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Connecting to SQL Server, please wait...

Starting SQL database backup...

Connecting to TSM Server as node 'TREELO_SQL'...

Beginning full backup for database test1, 1 of 1.

Full: 0 Read: 2183936 Written: 2183936 Rate: 1,949.50 Kb/Sec
Backup of test1 completed successfully.

Total SQL backups selected: 1
Total SQL backups attempted: 1
Total SQL backups completed: 1
Total SQL backups excluded: 0
Total SQL backups inactivated: 0

Throughput rate: 1,930.09 Kb/Sec
Total bytes transferred: 2,183,936
Elapsed processing time: 1.11 Secs

VSS Backup output examples

These output examples provide a sample of the text, messages, and process status that displays when using the backup command.

VSS Backup 1: full local

VSS Backup 1 performs a VSS full backup of database test1 to local shadow volumes using the new optional parameters, /backupdestination and /backupmethod.

Command:

    tdpsqlc backup test1 full /backupdestination=local /backupmethod=vss

Output:
VSS Backup 2: full local and TSM

VSS Backup 2 performs a VSS full backup of database *model* to local shadow volumes and Tivoli Storage Manager server storage using the new optional parameters, \texttt{/backupdestination} and \texttt{/backupmethod}.

Command:

\begin{verbatim}
tdpsqlc backup model full /backupdestination=both /backupmethod=vss
\end{verbatim}

Output:

VSS Backup 3: full local

VSS Backup 3 performs a VSS full backup of all available databases to local shadow volumes using the wildcard character (*). However, the new \texttt{/excludedb} parameter is used to exclude the \texttt{master} and \texttt{msdb} databases from being backed up.
Command:
```
  tdpsqlc backup * full /backupdestination=local /backupmethod=vss
  /exclude=master,msdb
```

Output:
```
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Connecting to SQL Server, please wait...

Connecting to TSM Server as node 'TREELO_SQL'...
Connecting to Local DSM Agent 'treelo_agent'...

Starting SQL database backup...

Beginning VSS backup of 'AdventureWorks', 'AdventureWorksDW', 'ReportServer',
'ReportServerTempDB', 'model', 'netapp_db1', 'netapp_db2', 'test1'...

Preparing to backup using snapshot.
Files Examined/Completed/Failed: [ 28 / 26 / 0 ] Total Bytes: 103510
Files Examined/Completed/Failed: [ 56 / 42 / 0 ] Total Bytes: 212963
Files Examined/Completed/Failed: [ 70 / 56 / 0 ] Total Bytes: 250250
Files Examined/Completed/Failed: [ 70 / 56 / 0 ] Total Bytes: 250250
Files Examined/Completed/Failed: [ 70 / 56 / 0 ] Total Bytes: 250250

VSS Backup 4: full local

VSS Backup 4 performs a VSS full backup of the test1 database.

Command:
```
  tdpsqlc backup test1 full /backupdestination=local /backupmethod=vss
```

Output:
```
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Connecting to SQL Server, please wait...

Connecting to TSM Server as node 'TREELO_SQL'...
Connecting to Local DSM Agent 'treelo_agent'...

Starting SQL database backup...

Beginning VSS backup of 'test1'...

Preparing to backup using snapshot.
Files Examined/Completed/Failed: [ 5 / 5 / 0 ] Total Bytes: 10698

VSS Backup operation completed with rc = 0
Files Examined : 5
Files Completed : 5
Files Failed : 0
Total Bytes : 10698
```
Query command

Use the query command to display information about the SQL server and its databases, about the Tivoli Storage Manager server and its backup objects, and about Data Protection for SQL.

Considerations:
• Some of the information displays may have long text lines and can be voluminous. You can redirect the informational output of the Data Protection for SQL query command to a text file using the Windows command output redirection syntax (command prompt):

```
TDPcommandstatement > [drive:]path\filename.ext
```
This creates or replaces the file.

```
TDPcommandstatement >> [drive:]path\filename.ext
```
This appends to the file.

You can then browse or edit the file.
• You can use the Windows more filter command (command prompt) to display the informational output one screen at a time, in conjunction with the Windows command pipe character: TDPcommandstatement | more

Query syntax

Use the query command syntax diagrams as a reference to view available options and truncation requirements.

Syntax

The syntax diagram of the Tivoli Storage Manager options corresponding to the letter above (A) follows the Optional Parameters below.

Query Optional Parameters:
A Query TSM Options:
Query positional parameters

Positional parameters immediately follow the query command and precede the optional parameters.

Specify one of the following when issuing a Data Protection for SQL query command:

**Query SQL *dbname,...**

This displays information about the current SQL server. The *dbname* variable specifies databases on the current SQL server to display information about.

When querying a SQL Server, the following information is included:

- Server name
- Database name
- Database data space allocated
- Database space used
- Database log space allocated
- Database log space used
- Database options set (SELECT INTO / BULK COPY, TRUNCATE LOG ON CHECKPOINT, etc.)

If you specify /compatibilityinfo:

- Server version
- Server clustering state
- Database compatibility level

**Query TDP**
This displays the Data Protection for SQL name and version information
and the contents of the current Data Protection for SQL configuration file.

**Query TSM *dbname,...**
This displays the Tivoli Storage Manager API and Tivoli Storage Manager
server version information. The dbname variable names the specified
databases from the current SQL server that have backup objects on the
current Tivoli Storage Manager server and node. No name is displayed if
specified objects do not exist as backup objects in the SQL database. Use
the dbname,... wildcard option to display information about all of the
backup objects of one or more SQL databases.

When querying any backup object using TSM dbname, the following
information is included:
- SQL server name
- SQL database name
- Backup object type
- Backup object active/inactive state
- Backup object Data Protection for SQL creation date and time
- Backup object Data Protection for SQL size
- Data Protection for SQL backup-object object name
- Number of data stripes in backup object

The following is included if you specify /compatibilityinfo:
- SQL server version
- SQL Server clustering state
- Data Protection for SQL version that created the backup object
- SQL database compatibility level
- SQL database data space allocated
- SQL database data space used
- SQL database log space allocated
- SQL database log space used
- SQL database options

**Note:**
- You can also determine which backup objects to display through the
  query TSM optional parameters /active and /all.
- No information will be displayed if there are no backup objects for a
  specified SQL database.

**File=*logicalfilename,...**
This displays information about file backup objects of one or more
SQL databases from the current SQL server that are on the current
Tivoli Storage Manager server and node.

**Full**
This displays information about full backup objects of one or more
SQL databases from the current SQL server that are on the current
Tivoli Storage Manager server and node.

**Difffull**
This displays information about differential backup objects of one
or more SQL databases from the current SQL server that are on the current Tivoli Storage Manager server and node.

**Group=*|groupname,...**

This displays information about one or more group backup objects of one or more SQL databases from the current SQL server that are on the current Tivoli Storage Manager server and node.

**Log=*|logobjectname,...**

This displays information about one or more log backup objects of one or more SQL databases from the current SQL server that are on the current Tivoli Storage Manager server and node. The `logobjectname` variable specifies which log backup objects to display information about. Use * as a wildcard character in `logobjectname` to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all log backup objects for the SQL databases.

**Set=*|setobjectname,...**

This displays information about one or more set backup objects of one or more SQL databases from the current SQL server that are on the current Tivoli Storage Manager server and node. The `setobjectname` variable specifies which set backup objects to display information about. Use * as a wildcard character in `setobjectname` to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all set backup objects for the SQL databases.

**Types**

This displays a summary by backup type of the backup objects of one or more SQL databases from the current SQL server that are on the current Tivoli Storage Manager server and node. Only backup types with one or more backup objects are displayed. If the `/all` optional parameter is specified, the number of inactive backup objects is included. You cannot specify either the `/compatibility` or the `/fileinfo` optional parameter with the `types` parameter.

### Query optional parameters

Optional parameters follow the `query` command and positional parameters.

The following are detailed descriptions of each of the optional parameters:

**/BUFFers=numbuffers**

The `/buffers` parameter specifies the number of data buffers used for each data stripe to transfer data between Data Protection for SQL and the Tivoli Storage Manager API. The `numbuffers` variable refers to the number of data buffers to use. The number can range from 2 to 8. The default is 3.

**Considerations:**

- You can improve throughput by increasing the number of buffers, but you will also increase storage use. Each buffer is the size specified in the `/buffersize` parameter.
- The default value is the value specified by the buffers configurable option in the Data Protection for SQL configuration file. This is initially 3.
- If you specify `/buffers`, its value is used instead of the value stored in the Data Protection for SQL configuration file. Specifying this parameter does not change the value in the configuration file.
The \texttt{/buffersize} parameter specifies the size of each Data Protection for SQL buffer specified by the \texttt{/buffers} parameter. The \texttt{buffersizeinkb} variable refers to the size of data buffers in kilobytes. The number can range from 64 to 8192. The default is 1024.

\textbf{Considerations:}
\begin{itemize}
  \item Though increasing the number of buffers can improve throughput, it also increases storage use as determined by this parameter.
  \item The default value is the value specified by the \texttt{buffers configurable} option in the Data Protection for SQL configuration file. This is initially 1024.
  \item If you specify \texttt{/buffersize}, its value is used instead of the value stored in the Data Protection for SQL configuration file. Specifying this parameter does not change the value in the configuration file.
\end{itemize}

\textbf{/COMPATibilityinfo}

For \texttt{query} operations, this parameter displays information related to the compatibility of a backup object with a SQL server. Certain SQL Server configuration options must be compatible before you can restore a backup object to a SQL server. When you specify this parameter, SQL and Data Protection for SQL configuration information is listed to help determine if a backup object is correct for a SQL server, or to help in problem determination.

\textbf{Considerations:}
\begin{itemize}
  \item You cannot specify this parameter with the \texttt{types} parameter on a \texttt{query TSM} command.
  \item Compatible generally means identical. However, if you use a binary sort order for both the SQL server and the backup object, the code pages may be different, although the interpretation of individual character values may result in different characters being displayed or printed.
\end{itemize}

\textbf{/CONFIGfile=filename}

The \texttt{/configfile} parameter specifies the name of the Data Protection for SQL configuration file, which contains the values for the Data Protection for SQL configurable options. See \texttt{"Set command" on page 177} for details on the file’s contents.

\textbf{Considerations:}
\begin{itemize}
  \item \texttt{filename} can include a fully qualified path. If \texttt{filename} does not include a path, it uses the directory where Data Protection for SQL is installed.
  \item If \texttt{filename} includes spaces, place it in double quotes.
  \item If you do not specify \texttt{/configfile}, the default value is \texttt{tdpsql.cfg}.
  \item If you specify \texttt{/configfile} but not \texttt{filename}, the default value \texttt{tdpsql.cfg} is used.
\end{itemize}

\textbf{/FROMSQLSERVer=servername}

For \texttt{restore}, the \texttt{/fromsqlserver} parameter specifies the SQL server that backup objects were backed up from. This parameter is necessary only when the name of the SQL server to restore to, as determined by the \texttt{sqlserver} parameter, is different from the name of the SQL server that the backup objects were created from. The default value is the \texttt{sqlserver} value or the value set in the Data Protection for SQL configuration file.

\textbf{Considerations:}
If the two SQL server names are different, you must use this parameter even if `/fromsqlserver` was a non-clustered default instance.

After you restore a SQL database to a different SQL server, the logins of the SQL database may not match the logins for the different SQL server. If appropriate, you can use the SQL stored procedure `SP_CHANGE_USERS_LOGIN` to find and correct such SQL login mismatches.

### /logfile=logfile

The `/logfile` parameter specifies the name of the activity log that is generated by Data Protection for SQL. This activity log records significant events such as completed commands and error messages. The Data Protection for SQL activity log is distinct from the SQL Server error log. The `logfile` variable identifies the name to be used for the activity log generated by Data Protection for SQL.

**Considerations:**

- If the specified file does not exist, it is created. If it does exist, new log entries are appended to the file.
- The file name can include a fully-qualified path; however, if you specify no path, the file is written to the directory where Data Protection for SQL is installed.
- You cannot turn Data Protection for SQL activity logging off. If you do not specify `/logfile`, log records are written to the default log file. The default log file is `tdpsql.log`.
- When using multiple simultaneous instances of Data Protection for SQL to perform operations, use the `/logfile` parameter to specify a different log file for each instance used. This directs logging for each instance to a different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.

### /logprune=numdays | No

The `/logprune` parameter prunes the Data Protection for SQL activity log and specifies how many days of entries are saved. By default, log pruning is enabled and performed once each day Data Protection for SQL is executed; however, this option allows you to disable log pruning or explicitly request a prune of the log for one command run even if the log file has already been pruned for the day. The `numdays` variable represents the number of days to save log entries. By default, 60 days of log entries are saved in the prune process.

**Considerations:**

- If you specify `numdays`, it can range from 0 to 9999. A value of 0 deletes all entries in the Data Protection for SQL activity log file except for the current command entries.
- If you specify `no`, the log file is not pruned during this command.
- If you do not specify `/logprune`, the default value is that specified by the logprune configurable option in the Data Protection for SQL configuration file. This is initially 60.
- If you specify `/logprune`, its value is used instead of the value stored in the Data Protection for SQL configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify `/logprune` without specifying `numdays` or `no`; in this case, the default 60 is used.
Changes to the value of the `timeformat` or `dateformat` parameter can result in an undesired pruning of the Data Protection for SQL log file. If you are running a command that may prune the log file and the value of the `timeformat` or `dateformat` parameter has changed, perform one of the following to prevent undesired pruning of the log file:

- Make a copy of the existing log file.
- Specify a new log file with the `/logfile` parameter or `logfile` setting.

/`OBJject=*`|`objectname`,...

For `restore` and `inactivate` operations, `/`object specifies that only particular backup objects for the specified SQL databases and backup object type (if specified) be restored or inactivated. For `query` operations, `/`object includes particular objects and object types in the display. The `objectname` variable specifies the names of the backup objects you want to restore or inactivate. The object name uniquely identifies each backup object and is created by Data Protection for SQL. Use `query` to view the names of backup objects. You can use `*` as a wildcard character in `objectname` to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all backup objects of the specified SQL databases and backup object type.

/`SQLAUTHentication=INTegrated  |  SQLuserid`  

This parameter specifies the authorization mode used when logging on to the SQL server. The `integrated` value specifies Windows authentication. The user id you use to log on to Windows is the same id you will use to log on to the SQL server. This is the default value. Use the `sqluserid` value to specify SQL Server user id authorization. The user id specified by the `/sqluserid` parameter is the id you will use to log on to the SQL server. Any SQL user id must have the SQL Server SYSADMIN fixed server role.

/`SQLPassword=sqlpasswordname`  

This parameter specifies the SQL password that Data Protection for SQL uses to log on to the SQL server that objects are backed up from or restored to.

Considerations:

- Using this parameter means that you are using SQL Server authentication. The SQL Server and the SQL user id for this password must both be configured for SQL Server authentication.
- If you do not specify `/sqlpassword`, the default value is blank (" ").
- If you specify `/sqlpassword` but not `sqlpasswordname`, the default is also blank (" ").
- This parameter is ignored if you use the `/sqlauth=integrated` parameter with it.

/`SQLSERVer=sqlprotocol:sqlservername`  

The `/sqlserver` parameter specifies the SQL server that Data Protection for SQL logs on to. Use `/sqlserver` for the `query SQL` command, but use `/fromsqlserver` for the `query TSM` command. The `sqlprotocol` variable specifies the communication protocol to use. You can specify one of the following protocols:

- `lp`: Use Shared Memory protocol.
- `np`: Use Named Pipes protocol.
- `tcp`: Use Transmission Control protocol.
- `via`: Use Virtual Interface Architecture protocol.
If no protocol is specified, Data Protection for SQL logs on to the SQL server according to the first protocol that becomes available.

**Considerations:**

- The default value is the value specified by the SQL server configurable option in the Data Protection for SQL configuration file. This is initially the local computer name.
- If you specify `/sqlserver` but not `sqlservername`, the local computer name is used.
- The following two shortcuts are accepted as the local computer name: . (local) These are a period or the word local within parentheses.
- If the SQL server is a member of a fail-over cluster, the CLUSTERNODE option in the Tivoli Storage Manager options file must have the value YES.
- You must specify the name if the SQL server is not the default instance or is a member of a fail-over cluster.
- The format of `sqlservername` depends on what type of instance it is and whether it is clustered or not:

<table>
<thead>
<tr>
<th>Format</th>
<th>Instance?</th>
<th>Clustered?</th>
<th>Name required?</th>
</tr>
</thead>
<tbody>
<tr>
<td>local-computername</td>
<td>default</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>local-computername\</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>\instancename</td>
<td>named</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>virtualservername</td>
<td>default</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>virtualservername\</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>\instancename</td>
<td>named</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

- `localcomputername`
  - The network computer name of the computer the SQL server and Data Protection for SQL reside on. The TCP/IP host name may not always be the same.

- `instancename`
  - The name given to the named instance of SQL Server specified during installation of the instance.

- `virtualservername`
  - The name given to the clustered SQL Server specified during clustering service setup. This is not the cluster or node name.

- `/SQLUSer=sqlusername`
  - The `/sqluser` parameter specifies the name that Data Protection for SQL uses to log on to the SQL server.

**Considerations:**

- Using this parameter means that you are using SQL Server authentication. The SQL Server and the SQL user id for this password must both be configured for SQL Server authentication.
- The SQL user id must have the SQL server SYSADMIN fixed server role.
- If you do not specify `/sqluser`, the default is `sa`.
- If you specify `/sqluser` but not `sqlusername`, the default is also `sa`.
- This parameter is ignored if you use the `/sqlauth=integrated` parameter with it.
/TSMNODEnode=tsmnodename
The /tsmnodename parameter specifies the Tivoli Storage Manager node name that Data Protection for SQL uses to log on to the Tivoli Storage Manager server. This identifies which Tivoli Storage Manager client is requesting services. You can also store the node name in the options file. The command line parameter overrides the value in the options file.

Considerations:
- You cannot use the /tsmnodename parameter if PASSWORDACCESS GENERATE is specified in the Tivoli Storage Manager options file. You must specify the nodename in the options file. Otherwise, you can change PASSWORDACCESS to PROMPT to utilize the /tsmnodename parameter. For details about the Tivoli Storage Manager options file, see the reference manual IBM Tivoli Storage Manager for Windows Backup-Archive Client Installation and User’s Guide.
- If you do not specify /tsmnodename, the default value is that specified by the nodename option in the Tivoli Storage Manager options file. Specifying this parameter does not change the value in the options file.

/TSMOPTFile=tsmoptfilename
The /tsmoptfile parameter specifies the Tivoli Storage Manager options file to use. This is similar to selecting a Tivoli Storage Manager server from the server list in the GUI. The Tivoli Storage Manager options file contains the configuration values for the Tivoli Storage Manager API. For details about the Tivoli Storage Manager options file, see the reference manual IBM Tivoli Storage Manager for Windows Backup-Archive Client Installation and User’s Guide.

Considerations:
- The tsmoptfilename variable can include a fully qualified path. If you do not include a path, the directory where Data Protection for SQL is installed is used.
- If tsmoptfilename includes spaces, you must enclose it in double quotes.
- If you do not specify /tsmoptfile, the default value is dsm.opt.
- If you specify /tsmoptfile but not tsmoptfilename, the default is also dsm.opt.

/TSMPassword=tsmpasswordname
The /tsmpassword parameter specifies the Tivoli Storage Manager password that Data Protection for SQL uses to log on to the Tivoli Storage Manager server. This parameter and the option PASSWORDACCESS in the Tivoli Storage Manager options file interact in the following ways:

<table>
<thead>
<tr>
<th>/tsmpassword</th>
<th>PASSWORDACCESS in Tivoli Storage Manager options file</th>
<th>Password already stored in registry?</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>specified</td>
<td>generate</td>
<td>yes</td>
<td>/tsmpassword ignored</td>
</tr>
<tr>
<td>specified</td>
<td>generate</td>
<td>no</td>
<td>/tsmpassword used and stored</td>
</tr>
<tr>
<td>specified</td>
<td>prompt</td>
<td>—</td>
<td>/tsmpassword used</td>
</tr>
<tr>
<td>not specified</td>
<td>prompt</td>
<td>—</td>
<td>user is prompted</td>
</tr>
</tbody>
</table>
Query output examples

These output examples provide a sample of the text, messages, and process status that displays when using the query commands.

Query 1–SQL Server

Query 1 queries the SQL server *mutalisk*. Note that it is set up for VSS operations.

**Command:**

```
tdpsqlc query sql
```

**Output:**

```
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Connecting to SQL Server, please wait...

SQL Server Information
-----------------------
SQL Server Name .......... TREEL0
SQL Server Version .............. 9.0.2047 (SQL Server 2005)
MSCS Cluster ................. No

Volume Shadow Copy Service (VSS) Information
----------------------------------------------
Writer Name : SqlServerWriter
Local DSMAgent Node : treelo_agent
Remote DSMAgent Node : amiga_agent
Writer Status : Online
Selectable Components : 10
```

Query 2–SQL Database

Query 2 queries SQL server database, *AdventureWorks* and includes compatibility information.

**Command:**

```
tdpsqlc query sql test2 /compat
```

**Output:**
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Connecting to SQL Server, please wait...

SQL Server Information
----------------------
SQL Server Name ....................... TREELO
SQL Server Version ................. 9.0.2047 (SQL Server 2005)
MSCS Cluster ......................... No

SQL Database Information
------------------------
SQL Database Name ................. AdventureWorks
SQL Database Data Space Allocated .... 171,900,928
SQL Database Data Space Used ........ 171,900,928
SQL Database Log Space Allocated .... 2,097,152
SQL Database Log Space Used .......... 756,736
SQL Database Compatibility level ...... 90
SQL Database Options ................ Truncate log on checkpoint

---

Query 3–TDP (Legacy)

Query 3 queries Data Protection for SQL for configuration file information. Note that this configuration is for Legacy operations only as BACKUPDESTination TSM, BACKUPMETHOD LEGACY, and the LOCALDSMAgentnode and REMOTEDSMAgentnode are not set.

Command:

tdpsqlc query tdp

Output:

IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Data Protection for SQL configuration settings
-----------------------------------------------
BACKUPDESTination ......................... TSM
BACKUPMETHOD ................................ LEGACY
BUFFers ...................................... 3
BUFFERSize .................................. 1024
DATEformat ................................... 1
DIFFESTimate .............................. 20
FROMSQLserver ..............................
LANGuage ..................................... ENU
LOCALDSMAgentnode ........................
LOGFile ..................................... tdpsql.log
LOGPrune .................................... 60
MOUNTWaitfordata ......................... Yes
NUMBERformat ................................ 1
REMTEDSMAgentnode ........................
SQLAUTHentication .......................... SQLuserid
SQLBUFFers ................................. 0
SQLBUFFERSize ............................ 1024
SQLSERVer ...................................
STRIPes ..................................... 1
TIMEformat ................................... 1

---
Query 4 – TDP (VSS)

Query 3 queries Data Protection for SQL for configuration file information. Note that this configuration is set for VSS operations as BACKUPDESTination LOCAL, BACKUPMETHod VSS, and the LOCALDSMAgentnode and REMOTEDSMAgentnode options are set.

Command:

```
  tdpsqlc query tdp
```

Output:

```
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Data Protection for SQL configuration settings
---------------------------------------------------
BACKUPDESTination ......................... LOCAL
BACKUPMETHod .............................. VSS
BUFFers ................................... 3
BUFFERSIze ................................ 1024
DATEformat ................................ 1
DIFFESTimate ................................ 20
FROMSQLserver ............................. TREELO
LANGuage .................................. ENU
LOCALDSMAgentnode ......................... treelo_agent
LOGFile ................................... tdpsql.log
LOGPrune .................................. 60
MOUNTwaitfordata .......................... Yes
NUMBERformat .............................. 1
REMITEDSMAgentnode ........................ amiga_agent
SQLAUTHentication ......................... INtegrated
SQLBUFFers ................................ 0
SQLBUFFERSIze ............................. 1024
SQLSERVER ................................. treelo
STRIPes ................................... 1
TIMEformat ................................ 1
```

Query 5 – TSM Types

Query 5 queries the Tivoli Storage Manager server for the types of backup objects from all databases, including both active and inactive objects.

Command:

```
  tdpsqlc query tsm * /all
```

Output:
Connecting to TSM Server as node 'TREELO_SQL'...
Querying TSM Server for Backups ....

<table>
<thead>
<tr>
<th>SQL Server Name</th>
<th>TREELO</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Database Name</td>
<td>test1</td>
</tr>
<tr>
<td>Backup Method</td>
<td>VSS</td>
</tr>
<tr>
<td>Backup Location</td>
<td>Srv</td>
</tr>
<tr>
<td>Backup Object Type</td>
<td>full</td>
</tr>
<tr>
<td>Backup Object State</td>
<td>Inactive</td>
</tr>
<tr>
<td>Backup Creation Date / Time</td>
<td>08/29/2010 23:24:14</td>
</tr>
<tr>
<td>Backup Size</td>
<td>4.00 MB</td>
</tr>
<tr>
<td>Database Object Name</td>
<td>20100829232414</td>
</tr>
<tr>
<td>Assigned Management Class</td>
<td>DEFAULT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SQL Server Name</th>
<th>TREELO</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Database Name</td>
<td>test1</td>
</tr>
<tr>
<td>Backup Method</td>
<td>VSS</td>
</tr>
<tr>
<td>Backup Location</td>
<td>Srv</td>
</tr>
<tr>
<td>Backup Object Type</td>
<td>full</td>
</tr>
<tr>
<td>Backup Object State</td>
<td>Active</td>
</tr>
<tr>
<td>Backup Creation Date / Time</td>
<td>08/30/2010 20:26:18</td>
</tr>
<tr>
<td>Backup Size</td>
<td>4.00 MB</td>
</tr>
<tr>
<td>Database Object Name</td>
<td>20100830202618</td>
</tr>
<tr>
<td>Assigned Management Class</td>
<td>DEFAULT</td>
</tr>
</tbody>
</table>
### Backup Object Information

<table>
<thead>
<tr>
<th>SQL Server Name</th>
<th>TREELO</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Database Name</td>
<td>test1</td>
</tr>
<tr>
<td>Backup Method</td>
<td>VSS</td>
</tr>
<tr>
<td>Backup Location</td>
<td>Loc</td>
</tr>
<tr>
<td>Backup Object Type</td>
<td>full</td>
</tr>
<tr>
<td>Backup Object State</td>
<td>Active</td>
</tr>
<tr>
<td>Backup Creation Date / Time</td>
<td>09/25/2010 10:17:18</td>
</tr>
<tr>
<td>Backup Size</td>
<td>4.00 MB</td>
</tr>
<tr>
<td>Database Object Name</td>
<td>20100925101718</td>
</tr>
<tr>
<td>Assigned Management Class</td>
<td>DEFAULT</td>
</tr>
</tbody>
</table>

### Backup Object Information

<table>
<thead>
<tr>
<th>SQL Server Name</th>
<th>TREELO</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Database Name</td>
<td>test1</td>
</tr>
<tr>
<td>Backup Method</td>
<td>Lgcy</td>
</tr>
<tr>
<td>Backup Location</td>
<td>Srv</td>
</tr>
<tr>
<td>Backup Object Type</td>
<td>Group</td>
</tr>
<tr>
<td>SQL Group Logical Name</td>
<td>PRIMARY</td>
</tr>
<tr>
<td>Backup Object State</td>
<td>Inactive</td>
</tr>
<tr>
<td>Backup Creation Date / Time</td>
<td>08/30/2010 12:43:39</td>
</tr>
<tr>
<td>Backup Size</td>
<td>2.08 MB</td>
</tr>
<tr>
<td>Database Object Name</td>
<td>20100830124339\000000AFC</td>
</tr>
<tr>
<td>Number of stripes in backup object</td>
<td>1</td>
</tr>
<tr>
<td>Assigned Management Class</td>
<td>DEFAULT</td>
</tr>
</tbody>
</table>

### Backup Object Information

<table>
<thead>
<tr>
<th>SQL Server Name</th>
<th>TREELO</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Database Name</td>
<td>test1</td>
</tr>
<tr>
<td>Backup Method</td>
<td>Lgcy</td>
</tr>
<tr>
<td>Backup Location</td>
<td>Srv</td>
</tr>
<tr>
<td>Backup Object Type</td>
<td>Full</td>
</tr>
<tr>
<td>Backup Object State</td>
<td>Inactive</td>
</tr>
<tr>
<td>Backup Creation Date / Time</td>
<td>09/10/2010 06:21:49</td>
</tr>
<tr>
<td>Backup Size</td>
<td>2.08 MB</td>
</tr>
<tr>
<td>Database Object Name</td>
<td>20100910062149\0000016DC</td>
</tr>
<tr>
<td>Number of stripes in backup object</td>
<td>1</td>
</tr>
<tr>
<td>Assigned Management Class</td>
<td>DEFAULT</td>
</tr>
<tr>
<td>SQL Server Name</td>
<td>TREELO</td>
</tr>
<tr>
<td>-----------------</td>
<td>--------</td>
</tr>
<tr>
<td>SQL Database Name</td>
<td>test1</td>
</tr>
<tr>
<td>Backup Method</td>
<td>Lgcy</td>
</tr>
<tr>
<td>Backup Location</td>
<td>Srv</td>
</tr>
<tr>
<td>Backup Object Type</td>
<td>Full</td>
</tr>
<tr>
<td>Backup Object State</td>
<td>Active</td>
</tr>
<tr>
<td>Backup Creation Date / Time</td>
<td>09/19/2010 13:33:25</td>
</tr>
<tr>
<td>Backup Size</td>
<td>2.08 MB</td>
</tr>
<tr>
<td>Database Object Name</td>
<td>20100919133325\000010DC</td>
</tr>
<tr>
<td>Number of stripes in backup object</td>
<td>1</td>
</tr>
<tr>
<td>Assigned Management Class</td>
<td>DEFAULT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SQL Server Name</th>
<th>TREELO</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Database Name</td>
<td>AdventureWorks</td>
</tr>
<tr>
<td>Backup Method</td>
<td>VSS</td>
</tr>
<tr>
<td>Backup Location</td>
<td>Srv</td>
</tr>
<tr>
<td>Backup Object Type</td>
<td>Full</td>
</tr>
<tr>
<td>Backup Object State</td>
<td>Inactive</td>
</tr>
<tr>
<td>Backup Creation Date / Time</td>
<td>08/30/2010 20:26:13</td>
</tr>
<tr>
<td>Backup Size</td>
<td>166.06 MB</td>
</tr>
<tr>
<td>Database Object Name</td>
<td>20100830202613</td>
</tr>
<tr>
<td>Assigned Management Class</td>
<td>DEFAULT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SQL Server Name</th>
<th>TREELO</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Database Name</td>
<td>AdventureWorks</td>
</tr>
<tr>
<td>Backup Method</td>
<td>VSS</td>
</tr>
<tr>
<td>Backup Location</td>
<td>Srv</td>
</tr>
<tr>
<td>Backup Object Type</td>
<td>Full</td>
</tr>
<tr>
<td>Backup Object State</td>
<td>Active</td>
</tr>
<tr>
<td>Backup Creation Date / Time</td>
<td>09/05/2010 12:06:15</td>
</tr>
<tr>
<td>Backup Size</td>
<td>166.06 MB</td>
</tr>
<tr>
<td>Database Object Name</td>
<td>20100905120615</td>
</tr>
<tr>
<td>Assigned Management Class</td>
<td>DEFAULT</td>
</tr>
</tbody>
</table>
### Backup Object Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Server Name</td>
<td>TREELO</td>
</tr>
<tr>
<td>SQL Database Name</td>
<td>AdventureWorks</td>
</tr>
<tr>
<td>Backup Method</td>
<td>Lgcy</td>
</tr>
<tr>
<td>Backup Location</td>
<td>Srv</td>
</tr>
<tr>
<td>Backup Object Type</td>
<td>Full</td>
</tr>
<tr>
<td>Backup Object State</td>
<td>Active</td>
</tr>
<tr>
<td>Backup Creation Date / Time</td>
<td>09/19/2010 13:32:56</td>
</tr>
<tr>
<td>Backup Size</td>
<td>166.08 MB</td>
</tr>
<tr>
<td>Database Object Name</td>
<td>20100919133256\000010DC</td>
</tr>
<tr>
<td>Number of stripes in backup object</td>
<td>1</td>
</tr>
<tr>
<td>Assigned Management Class</td>
<td>DEFAULT</td>
</tr>
</tbody>
</table>

### Backup Object Information

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Server Name</td>
<td>TREELO</td>
</tr>
<tr>
<td>SQL Database Name</td>
<td>netapp_db2</td>
</tr>
<tr>
<td>Backup Method</td>
<td>VSS</td>
</tr>
<tr>
<td>Backup Location</td>
<td>Srv</td>
</tr>
<tr>
<td>Backup Object Type</td>
<td>full</td>
</tr>
<tr>
<td>Backup Object State</td>
<td>Inactive</td>
</tr>
<tr>
<td>Backup Creation Date / Time</td>
<td>09/05/2010 11:50:29</td>
</tr>
<tr>
<td>Backup Size</td>
<td>4.00 MB</td>
</tr>
<tr>
<td>Database Object Name</td>
<td>20100905115029</td>
</tr>
<tr>
<td>Assigned Management Class</td>
<td>DEFAULT</td>
</tr>
</tbody>
</table>
Query 6–Tivoli Storage Manager Database

Query 6 queries the Tivoli Storage Manager server for database netapp_db2, and displays all of its active backup objects by default.

Command:

tdpsqlc query tsm netapp_db2

Output:
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Connecting to TSM Server as node 'TREELO_SQL'...

Querying TSM Server for Backups ....

Backup Object Information
-------------------------
SQL Server Name ....................... TREELO
SQL Database Name ........................ netapp_db2
Backup Method ........................ VSS
Backup Location ........................ Srv
Backup Object Type ..................... full
Backup Object State ...................... Active
Backup Creation Date / Time .......... 09/05/2010 12:14:16
Backup Size .............................. 4.00 MB
Database Object Name ................... 20100905121416
Assigned Management Class ................ DEFAULT

Backup Object Information
-------------------------
SQL Server Name ....................... TREELO
SQL Database Name ........................ netapp_db2
Backup Method ........................ Lgcy
Backup Location ........................ Srv
Backup Object Type ..................... Full
Backup Object State ...................... Active
Backup Creation Date / Time .......... 09/25/2010 10:50:48
Backup Size .............................. 2.08 MB
Database Object Name ................... 20100925105048\00001740
Number of stripes in backup object ... 1
Assigned Management Class ................ DEFAULT

Query 7–TSM Database

Query 7 queries the Tivoli Storage Manager server for information on database netapp_db2 Group-type backup objects.

Command:

tdpsqlc query tsm netapp_db2 Group=*  

Output:
Connecting to TSM Server as node 'TREELO_SQL'...

Backup Object Information
-------------------------

SQL Server Name ....................... TREELO
SQL Database Name ..................... netapp_db2
Backup Method ......................... Lgcy
Backup Location ....................... Srv
Backup Object Type .................... Group
SQL Group Logical Name ............... PRIMARY
SQL Group Space Allocated .......... 96,439,680
SQL Group Space Used ................. 87,293,952
SQL File Logical Name ............... File1Group1
SQL File Physical Name ............... C:\Program Files\Microsoft SQL Server\MSSQL$RBSTEST11_2010\data\File1Group1_Data.NDF
Number of stripes in backup object ... 1
Assigned Management Class .......... DEFAULT

Query 8 –TSM Database

Query 8 displays both active and inactive full backup objects of database Test1. In addition, file information is requested.

Command:

```
tdpsqlc q tsm Test1 full /fileinfo /all
```

Output:

```
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 5.0, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Backup Object Information
-------------------------

SQL Server Name ....................... RBSTEST11\RBSTEST11_2000
SQL Database Name ..................... Test1
Backup Object Type .................... Full
backup Creation Date / Time .......... 06/27/2010 11:15:44
Backup Size .......................... 89,607,680
Database Object Name ................. 20100627111544\00000700
Number of stripes in backup object ... 1
SQL Group Logical Name ............... Group1
SQL Group Space Allocated .......... 96,439,680
SQL Group Space Used ................. 87,293,952
SQL File Logical Name ............... File1Group1
SQL File Physical Name ............... C:\Program Files\Microsoft SQL Server\MSSQL$RBSTEST11_2010\data\File1Group1_Data.NDF
```
Chapter 5. Command line interface  129
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 SQL.

This command is valid for all Windows platforms supported by Data Protection for SQL.
Parameters

/DETAILED

Results in a detailed listing of snapped volumes. If this option is not specified then only the total capacity is displayed.

/TSMOPTFile=dsmsoptfilename

The /tsmoptfile parameter specifies the Data Protection for SQL options file to use.

Considerations:

- The dsmsoptfilename variable can include a fully qualified path. If you do not include a path, the Data Protection for SQL installation directory is used.
- If the dsmsoptfilename variable spaces, enclose it in double quotation marks.
- If you do not specify /tsmoptfile, the default value is dsmsopt.
- If you specify /tsmoptfile but not dsmsoptfilename, the default is also dsmsopt.

SQL Server 2005 example

Query the total managed capacity of SQL Server 2005 data represented in the local inventory with a detailed listing of snapped volumes. In this example there is a total of 1.25 TB of managed capacity. The detailed output shows that there are two snapshots of volumeid_1 and one snapshot of volumeid_2. Each unique volume is only counted once so the total adds up to 1.25 TB. “tdpsqlc query managedcapacity /detailed”:

Managed Capacity: 1.25 TB
Volume: volumeid_1
Snapshot: snapshotid_1
Managed Capacity: 0.50 TB
Volume: volumeid_2
Snapshot: snapshotid_1
Managed Capacity: 0.75 TB

SQL Server 2008 example

Query the total managed capacity of SQL Server 2008 data represented in the local inventory with a detailed listing of snapped volumes. “tdpsqlc query managedcapacity /detailed”: 
Total Managed Capacity : 63.99 GB (68,706,877,440 bytes)
Volume : H:
Managed Capacity : 16.00 GB (17,176,719,360 bytes)
Volume : I:
Managed Capacity : 16.00 GB (17,176,719,360 bytes)
Volume : Q:
Managed Capacity : 16.00 GB (17,176,719,360 bytes)
Volume : N:
Managed Capacity : 16.00 GB (17,176,719,360 bytes)

**Restore command**

Use the **restore** command to restore all or part of one or more SQL databases.

Use this command to restore all or part of one or more SQL databases from Tivoli Storage Manager storage to a SQL server.

**Considerations:**

- Make sure to review the VSS Restore command-line considerations on page 133 before attempting any type of VSS Restore operation.
- You cannot restore SQL databases currently in use. By placing SQL databases to be restored in single-user mode, you can avoid attempting such restores. If you are restoring the master database, you must start the SQL server in single-user mode by using the -m SQL SERVER startup option. For user mode and master database details, refer to Appendix E, “Setting user mode,” on page 217 and Appendix E, “Restoring the master database,” on page 215.

**Note:**

1. The single user of the SQL databases or server must be the same user that Data Protection for SQL uses to log on to the SQL server for the restore.
2. SQL Enterprise Manager, SQL Server Application Client, and other SQL Server services can be users of databases and the SQL server.

- The user used by Data Protection for SQL to log on to the SQL server must have the SQL Server SYSADMIN fixed server role.
- You can use the TRANSACT-SQL database consistency checker statement DBCC CHECKDB ('DBNAME') to verify the integrity of the restored SQL databases.

**Note:** During SQL database restore processing, the SQL Server prepares the database files after first restoring a minimal amount of metadata. For large SQL databases, the preparation of the database files can be time consuming. To prevent a restore operation from ending prematurely, specify a value of at least 10000 in the commtimeout option. If the restore operation is performed in a LAN free environment, this value must be specified for the Storage Agent.

**Date and time recovery (Legacy only)**

The **restoredate** and **restoretine** parameters allow restore and recovery of the specified database to the date and time specified. These parameters automate the restore of the appropriate full backup, related differential and log backups, and recovers the database to the specified point in time. The behavior when these parameters are used is as follows:
If only full plus log backups exist, then the following actions occur:
- The most recent full backup prior to the specified `restoredate` and `restoret ime` is restored.
- All logs up to the first log backed up after the specified `restoredate` and `restoret ime` is restored.
- Recovery up to the specified `restoredate` and `restoret ime` (using `stopat`) is completed.

If only full backups or full plus differential backups exist, then the following actions occur:
- The most recent full backup prior to the specified `restoredate` and `restoret ime` is restored.
- The most recent differential backup (if any exists) prior to the specified `restoredate` and `restoret ime` is restored.

If full plus differential plus log backups exist, then the following actions occur:
- The most recent full backup prior to the specified `restoredate` and `restoret ime` is restored.
- The most recent differential backup prior to the specified `restoredate` and `restoret ime` is restored.
- All log backups after the differential and up to the first log backed up after the `restoredate` and `restoret ime` is restored.
- Recovery up to the specified `restoredate` and `restoret ime` (using `stopat`) is completed.

**VSS Restore command-line considerations**

Be aware of the following 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):

- If you plan to perform a VSS Restore of the master database, see [Appendix E](#) "Restoring the master database" on page 215 for step-by-step instructions.
- A VSS Instant Restore overwrites the entire contents of the source volumes. However, you can avoid overwriting the source volumes by specifying `/instantrestore=no`. This parameter setting bypasses volume-level copy and uses file-level copy instead to restore the files from a VSS Backup that resides on local shadow volumes. It is recommended that the source volume contain only the SQL database.
- Be aware that when a VSS 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.
- In order to perform a VSS Instant Restore with versions of the IBM Tivoli Storage Manager Client earlier than 6.1.0, the IBM Tivoli Storage Manager for FlashCopy Manager Hardware Devices Snapshot Integration Module must be installed.
- 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.
Restore syntax

Use the restore command syntax diagrams as a reference to view available options and truncation requirements.

Syntax

The syntax diagrams of the backup object type options corresponding to the letters above (A,B,C,D,E,F) follow the Optional Parameters below.

For a description of the restore positional parameters, see "Restore positional parameters" on page 137.

Restore Optional Parameters:
A Restore File Options:
B Restore Full Options:

B1 Restore Full Options 1:

B2 Restore Full Options 2:

C Restore Diff Options:

D Restore Group Options:
E Restore Log Options:

- /RECOvery = Yes
- /RECOvery = No
- /STANDby = undofilename
- /STOPAT = datetime
- /STOPATMark = markname
- /AFTER = datetime
- /STOPBEFOREMark = markname
- /AFTER = datetime

F Restore Set Options:

- /Files = logicalfilename,*
- /Groups = groupname
- /Retrieve

Restore positional parameters

Positional parameters immediately follow the restore command and precede the optional parameters.

File=*logicalfilename,.. A file backup contains only the contents of the SQL server logical file you specify. You can use this option when it is not practical to back up an entire SQL database due to available backup time and space or due to performance requirements. This option restores file backup objects for the SQL databases you specify. The logicalfilename variable specifies the names of the SQL server database logical files you want to restore to.

Considerations:
- You can specify this parameter more than once per command invocation.
- Use * as a wildcard character in logicalfilename to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all logical files in the SQL server database. Since each logical file backed up creates a separate backup object on the Tivoli Storage Manager server, specifying only the wildcard character results in a separate backup object for each logical file in the SQL server database.
- If logicalfilename includes spaces or special characters, enclose it in double quotes.
- The logicalfilename variable is case-sensitive.
- You cannot specify the /recopery parameter with restore file operations.
FULL  This option restores all full database backup objects for the SQL databases you specify.

DIFFerential  
A differential database backup contains only the parts of a SQL server database changed since the latest full backup plus enough of the SQL database's transaction log to make a restore consistent. As such, a differential backup usually takes up less space than a full backup. Use this option so that all individual log backups since the last full database backup do not need to be applied. This option saves time during a restore by replacing the restore of a number of transaction log backups.

Group=*|groupname,...  
This option restores all group database backup objects for the SQL databases you specify. The groupname variable specifies the names of the SQL server database file groups you want to restore.

Considerations:
• You can specify this parameter more than once per command invocation.
• Use * as a wildcard character in the groupname variable to replace zero or more characters for each occurrence.
• Specifying only the wildcard character indicates all file groups in the SQL server database.
• If the groupname variable includes spaces or special characters, enclose it in double quotes.
• The groupname variable is case-sensitive.
• You cannot specify the /recovery parameter with restore group operations.

Log or Log=*|logobjectname,...  
This option restores all log database backup objects for the SQL databases you specify. The log parameter takes the wildcard or logobjectname value. The logobjectname variable specifies the log backup objects to restore. Use * as a wildcard character in logobjectname to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all log backup objects for the SQL databases. You can specify this parameter more than once per command invocation.

Set or Set=*|setobjectname,...  
This option restores all set database backup objects for the SQL databases you specify. The set parameter takes the wildcard or setobjectname value. The setobjectname variable specifies the set backup objects to restore. Use * as a wildcard character in setobjectname to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all set backup objects for the SQL databases.

Considerations:
• You can specify this parameter more than once per command invocation.
• You cannot specify the /recovery parameter with restore set operations.
Restore optional parameters

Optional parameters follow the `restore` command and positional parameters.

The following are detailed descriptions of each of the optional 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 SQL preferences file (tdpsql.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 if no value is specified in the Data Protection for SQL preferences file (tdpsql.cfg).

**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 SQL preferences file (tdpsql.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 if no value is specified in the Data Protection for SQL preferences file (tdpsql.cfg).

**VSS**  
The restore is performed with VSS.

`/BUFFers=numbuffers`

The `/buffers` parameter specifies the number of data buffers used for each data stripe to transfer data between Data Protection for SQL and the Tivoli Storage Manager API. The `numbuffers` variable refers to the number of data buffers to use. The number can range from 2 to 8. The default is 3.

Considerations:

- You can improve throughput by increasing the number of buffers, but you will also increase storage use. Each buffer is the size specified in the `/buffersize` parameter.
- The default value is the value specified by the buffers configurable option in the Data Protection for SQL configuration file. This is initially 3.
- If you specify `/buffers`, its value is used instead of the value stored in the Data Protection for SQL configuration file. Specifying this parameter does not change the value in the configuration file.
- If you specify `/buffers` but not `numbuffers`, the default value 3 is used.

`/BUFFERSIze=buffersizeinkb`

The `/buffersize` parameter specifies the size of each Data Protection for SQL buffer specified by the `/buffers` parameter. The `buffersizeinkb` variable refers to the size of data buffers in kilobytes. The number can range from 64 to 8192. The default is 1024.

Considerations:
• Though increasing the number of buffers can improve throughput, it also increases storage use as determined by this parameter.

• The default value is the value specified by the buffers configurable option in the Data Protection for SQL configuration file. This is initially 1024.

• If you specify /buffersize, its value is used instead of the value stored in the Data Protection for SQL configuration file. Specifying this parameter does not change the value in the configuration file.

• If you specify /buffersize but not buffersizeinkb, the default value 1024 is used.

/CONFIGfile=confilename

The /configfile parameter specifies the name of the Data Protection for SQL configuration file, which contains the values for the Data Protection for SQL configurable options. See “Set command” on page 177 for details on the contents of the file.

Considerations:
• configfilename can include a fully qualified path. If configfilename does not include a path, it uses the directory where Data Protection for SQL is installed.
• If configfilename includes spaces, place it in double quotes.
• If you do not specify /configfile, the default value is tdpsql.cfg.
• If you specify /configfile but not configfilename, the default value tdpsql.cfg is used.

/DBOonly

Specifying the /dboonly parameter prevents general users from accessing a restored database before it is determined to be ready for such access. This parameter ensures that the database option RESTRICTED USER is set after a restore operation.

/FROMSQLSERVER=sqlservername

For restore, the /fromsqlserver parameter specifies the SQL server that backup objects were backed up from. This parameter is necessary only when the name of the SQL server to restore to, as determined by the sqlserver parameter, is different from the name of the SQL server that the backup objects were created from. Use /fromsqlserver for query TSM and inactivate commands, but use /sqlserver for query SQL commands. The default value is the /sqlserver value or the value set in the Data Protection for SQL configuration file.

Considerations:
• If the two SQL server names are different, you must use this parameter even if /fromsqlserver was a non-clustered default instance.
• After you restore a SQL database to a different SQL server, the logins of the SQL database may not match the logins for the different SQL server. If appropriate, you can use the SQL stored procedure SP_CHANGE_USERS_LOGIN to find and correct such SQL login mismatches.

/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, DS6000, DS8000, or XIV Gen 2 storage subsystem is required to perform VSS Instant Restores.
You can specify:

**Yes**  Use volume level snapshot restore for a VSS Backup that resides on local shadow volumes if the backup exists on volumes that support it. This is the default.

**No**  Use file-level copy to restore the files from a VSS Backup that resides on local shadow volumes. Note that bypassing volume-level copy means that SQL database files, log files, and the checkpoint file are the only data overwritten on the source volumes.

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 Gen 2 or SAN Volume Controller with space-efficient target volumes.

**/INTO=dbname**
For restore operations, `/into` specifies the SQL server database that you want a backup object restored into. This parameter is necessary only when the name of the SQL server database to restore into is different from the backup object database name.

**Important:** The `/into` parameter is only available when the restored database is relocated with the `/relocate /to` or `/relocatedir` parameter.

**Considerations:**
- When you specify `/into`, wildcards (*) may not appear in either the command `dbname` variable or the `/into` `dbname` variable.
- There must be exactly one item in the `/into` `dbname` variable list as well as in the command `dbname` list.
- The SQL server database that you want a backup object restored into must exist for the restore to be successful.

**/LOGFile=logfilename**
The `/logfile` parameter specifies the name of the activity log that is generated by Data Protection for SQL. This activity log records significant events such as completed commands and error messages. The Data Protection for SQL activity log is distinct from the SQL Server error log. The `logfilename` variable identifies the name to be used for the activity log generated by Data Protection for SQL.

**Considerations:**
- If the specified file does not exist, it is created. If it does exist, new log entries are appended to the file.
- The file name can include a fully-qualified path; however, if you specify no path, the file is written to the directory where Data Protection for SQL is installed.
- You cannot turn Data Protection for SQL activity logging off. If you do not specify `/logfile`, log records are written to the default log file. The default log file is `tdpsql.log`.
- When using multiple simultaneous instances of Data Protection for SQL to perform operations, use the `/logfile` parameter to specify a different log file for each instance used. This directs logging for each instance to a
different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.

/LGPrune=|No

The `/logprune` parameter prunes the Data Protection for SQL activity log and specifies how many days of entries are saved. By default, log pruning is enabled and performed once each day Data Protection for SQL is executed; however, this option allows you to disable log pruning or explicitly request a prune of the log for one command run even if the log file has already been pruned for the day. The `numdays` variable represents the number of days to save log entries. By default, 60 days of log entries are saved in the prune process.

Considerations:
- If you specify `numdays`, it can range from 0 to 9999. A value of 0 deletes all entries in the Data Protection for SQL activity log file except for the current command entries.
- If you specify `no`, the log file is not pruned during this command.
- If you do not specify `/logprune`, the default value is that specified by the logprune configurable option in the Data Protection for SQL configuration file. This is initially 60.
- If you specify `/logprune`, its value is used instead of the value stored in the Data Protection for SQL configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify `/logprune` without specifying `numdays` or `no`; in this case, the default 60 is used.
- Changes to the value of the `timeformat` or `dateformat` parameter can result in an undesired pruning of the &agentname; log file. If you are running a command that may prune the log file and the value of the `timeformat` or `dateformat` parameter has changed, perform one of the following to prevent undesired pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the `/logfile` parameter or `/logfile` setting.

/MOUNTWait=|No

If the Tivoli Storage Manager server is configured to store backup data on removable media such as tapes or optical media, it is possible that the Tivoli Storage Manager server may indicate to Data Protection for SQL that it is waiting for a required storage volume to be mounted. If that occurs, this option allows you to specify whether Data Protection for SQL `backup`, `restore`, and `query TSM /fileinfo` commands wait for the media mount or stop the current operation.

You can specify:
- **Yes**  Wait for tape mounts (default for `backup` and `restore`).
- **No**  Do not wait for tape mounts (default for `query TSM /fileinfo`).

Considerations:
- If you use data striping, Data Protection for SQL cannot complete waiting until the initial media for all stripes are available, although Data Protection for SQL starts to use each stripe as its media becomes available. Because of the way SQL Server distributes data among stripes, if any stripe does not have its media available, each of the stripes may eventually be either waiting for its own or another stripe's media to
become available. In this case, it may become necessary to terminate the Data Protection for SQL command from a prolonged wait. This can be done only by terminating the Data Protection for SQL program (close the command prompt window or enter control-c).

- For backup, if the management class for meta objects also requires removable media, Data Protection for SQL waits for that volume, but because meta objects are not created until after the data objects are complete, the wait occurs after all of the data is transferred.
- If you specify no and any removable media are required, Data Protection for SQL terminates the command with an error message. This is also true if the management class for meta objects requires removable media. For backup, since the meta objects are not created until after the data objects are complete, the command termination does not occur until after all of the database data is transferred.
- If you do not specify /mountwait with backup or restore, the default value is that specified in the mountwait configurable option in the Data Protection for SQL configuration file. This is initially yes. Specifying this parameter does not change the value in the configuration file.
- If you specify /mountwait but neither yes nor no, the default yes is used.
- If you do not specify /mountwait with a query TSM /fileinfo request, the default value no is used.

/OBJ ect=*|objectname,...
For restore and inactivate operations, /object specifies that only particular backup objects for the specified SQL databases and backup object type (if specified) be restored or inactivated. For query operations, /object includes particular objects and object types in the display. The objectname variable specifies the names of the backup objects you want to restore or inactivate. The object name uniquely identifies each backup object and is created by Data Protection for SQL. Use query to view the names of backup objects.

Considerations:
- If you do not specify restore, only the active backup object is included in the restore.
- You can use * as a wildcard character in objectname to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all backup objects of the specified SQL databases and backup object type.

/PARTial
The /partial parameter restores only part of a SQL database. You can perform partial restores only on full database backup objects. The primary purpose of a partial restore is to retrieve lost or damaged data. A partial restore creates a subset of the SQL database. After the partial restore, differential database restores and transaction log restores can return the subset SQL database to a point where the required data exists or is undamaged. You can then copy the required data from the subset SQL database to the original SQL database. You can also use partial restores whenever you need a subset of a SQL database, such as for development or reporting purposes.

Note: A partial restore always restores the entire backup object from the Tivoli Storage Manager server although only a portion of the restored object may be used to complete a recovery. The statistics displayed reflect
the amount of data restored from the Tivoli Storage Manager server only, not the amount of data used by the SQL Server for database recovery.

Considerations:
- You can specify the content of a partial restore with the files or groups parameters.
  - You can restore only complete SQL groups, even if you did not specify all SQL files in a SQL group with the files option.
  - The primary group is always included.
  - SQL groups not restored are marked offline and are not accessible.
- If you are restoring the subset SQL database to a location where it was backed up, you must use the /relocate and /to parameters.
- The Data Protection for SQL GUI does not support the /relocate and /to parameters. You must use the command line interface when performing a partial restore that requires these parameters.
- You can specify the /recovery parameter with /partial.

/Quiet The /quiet parameter omits displaying status information from the command. However, the information is appended to the Data Protection for SQL activity log.

/RECOVERY=Yes | No
For restore operations, /recovery specifies whether or not you want to make additional restores to a SQL database that is not on a standby SQL server. A restored database cannot be used until the /recovery=yes parameter is administered to the database. You can specify:

Yes (default)
Whenever you make a sequence of restores to a SQL database and the current restore is the final restore in the sequence, or is the only restore to a SQL database. This informs the SQL server the restore is complete and ready for uncompleted transactions to be rolled back.

No Whenever you make a sequence of restores to a SQL database and the current restore is not the final restore in the sequence. Issue /recovery=no for all restore commands except the last one.

Considerations:
- Once the /recovery=yes parameter is administered, you cannot restore any more differential or log backups to the database.
- You cannot specify /recovery for restore operations of file, group, or set backup objects. Data Protection for SQL forces such restores to /recovery=no.
- For full restores that specify /groups or /files, unless you also specify /partial, you cannot specify /recovery. Without /partial, Data Protection for SQL forces such restores to /recovery=no.
- Not specifying this option automatically rolls back incompleted transactions for the database.
- When you specify yes and you are restoring several restore objects for the same database, only the final restore object for the database uses recovery=yes; all others use recovery=no. This allows you to specify a list of logs without having to specify the final log in a separate command.

The following is a sample scenario:
Sequence of Restores | Specify
---|---
full database | no
Differential database | no
transaction log backup object | no
transaction log backup object | yes

Note:
1. Data Protection for SQL sorts the restore objects by database name, and, within database name, by backup time stamp from earliest to latest. A query TSM command will also display this order.
2. If a restore object fails, then all subsequent restore objects for that database in a single restore command are skipped. This is true no matter what the /recovery or /standby settings are.

/RELocate=logicalfilename,... /TO=physicalfilename,...

For restore operations, the /relocate and /to parameters as a pair specify the new location of a SQL database file. You must use this parameter for every SQL database file that you are not restoring to its original drive, complete path, and file name. The logicalfilename variable specifies the logical file name of the SQL database file you want to relocate. The physicalfilename variable specifies the new physical Windows file name where you want to relocate the SQL database file. This parameter is available when restoring Legacy backups only.

Considerations:
- You cannot specify more than one database name as the value for the restore command when specifying /relocate.
- /relocate and /to can each take a list of values and can be specified more than once. However, as a pair, /relocate and /to must take the same number of values, and the values must be paired in order of appearance. For example,
  
  /relocate=a,b,c /to=a1,b1,c1

  is valid, but not
  /relocate=a,b,c /to=b1,a1

- The Data Protection for SQL GUI does not support the /relocate and /to parameters. You must use the command line interface when performing a partial restore that requires these parameters.
- You can use the query command with the /fileinfo parameter to determine the logical file names and physical file names in the backup object.
- If either logicalfilename or physicalfilename includes spaces, you must enclose it in double quotes.
- For physicalfilename, include the complete drive, path, and file name of the new file.
- The drive and path of the new physical file name must exist, but if the file does not yet exist, SQL Server will create it. Additionally, if the file does exist, you may be required to use the /replace parameter.
- The wildcard (*) is not allowed in the values for either /relocate or /to.

/RELOCATEDir=dbfiledir[,...]logfiledir[,...]otherfiledir]}

The /relocatedir parameter specifies the new destination locations in which
to restore the backed up SQL databases, logs, and SQL Server full-text index files. FILESTREAM files are included for SQL Server 2008 and SQL Server 2008 R2. This parameter is available when restoring VSS Backups or Legacy backups.

The `dbfiledir` variable specifies the directory location of the SQL database you want to relocate. Note that if the `logfiledir` and/or `otherfiledir` variables are not specified, the logs and SQL Server full-text index files are restored to the directory specified by `dbfiledir`.

The `logfiledir` variable specifies the directory location of the SQL log files you want to relocate. Note that if the `logfiledir` variable is not specified, the SQL log files are restored to the directory specified by `dbfiledir`.

The `otherfiledir` variable specifies the directory location of the SQL Server full-text index files and FILESTREAM files (SQL Server 2008 and SQL Server 2008 R2) are included for you want to relocate. Note that if the `otherfiledir` variable is not specified, the SQL Server full-text index files and FILESTREAM files (SQL Server 2008 and SQL Server 2008 R2) are restored to the directory specified by `dbfiledir`.

/REPlace

For `restore` operations, the `/replace` parameter specifies that you want existing SQL files to be overwritten when they otherwise would not be.

You may have to use this parameter in the following instances:

- You are performing a full database restore, and one of the following is true:
  - You are using the `/into` parameter, and the `/into` database already exists on the SQL server.
  - The database already exists on the SQL server, and one of the following is also true:
    - The number of SQL files in the existing database differs from the number of SQL files in the full database backup object.
    - The names of one or more SQL files in the existing database are not the names of any of the SQL files in the full database backup object.

- You are performing a file, group, or set restore, and one or more of the SQL files already exist.

/RESTOREDate=\date

The `/restoredate` parameter specifies a date to which the database identified by `dbname` is to be recovered. The date value must be specified in the same date format defined in the Data Protection for SQL preferences file. If `/restoredate` is not specified but `/restorettime` is specified, the `/restoredate` value is the current date. The `/restoredate` parameter is only available for Legacy restore operations. It can only be specified when restoring a full database backup. The `/restorettime` parameter cannot be used to restore file, group, and set backups.

/RESTORETime=\time

The `/restorettime` parameter specifies the time of day to which the database identified by `dbname` is to be recovered. The time value must be specified in the same time format defined in the Data Protection for SQL preferences file. If `/restorettime` is not specified but `/restoredate` is specified, the `/restorettime` is the current time. The `/restorettime` parameter is only available for Legacy restore operations. It can only be specified when
restoring a full database backup. The /restoretim<e> parameter cannot be
used to restore file, group, and set backups.

/SQLAUTHentication=INTEGRated | SQLuserid
This parameter specifies the authorization mode used when logging on to
the SQL server. The integrated value specifies Windows authentication.
The user id you use to log on to Windows is the same id you will use to
log on to the SQL server. This is the default value. Use the sqluserid value
to specify SQL Server user id authorization. The user id specified by the
/sqluserid parameter is the id you will use to log on to the SQL server.
Any SQL user id must have the SQL Server SYSADMIN fixed server role.

/SQLBUFFers=numsqlbuffers
The /sqlbuffers parameter specifies the total number of data buffers SQL
Server uses to transfer data between SQL Server and Data Protection for
SQL. The numsqlbuffers variable refers to the number of data buffers to use.
The number can range from 0 to 999. The initial value is 0. When
/sqlbuffers is set to 0, SQL determines how many buffers should be used.

Considerations:
• The default value is the value specified by the SQL buffers configurable
  option in the Data Protection for SQL configuration file. This is initially 0.
• If you specify /sqlbuffers, its value is used instead of the value stored in
  the Data Protection for SQL configuration file. Specifying this parameter
does not change the value in the configuration file.
• If you specify /sqlbuffers but not numsqlbuffers, the default value 0 is
  used.

/SQLBUFFERSIZE=sqlbuffersizeinkb
The /sqlbuffersize parameter specifies the size of each buffer (specified by
the /sqlbuffers parameter) SQL Server uses to transfer data to Data
Protection for SQL. The sqlbuffersizeinkb variable refers to the size of data
buffers in kilobytes. The number can range from 64 to 4096. The default is
1024.

Considerations:
• The default value is the value specified by the SQL buffers configurable
  option in the Data Protection for SQL configuration file. This is initially
  1024.
• If you specify /sqlbuffersize, its value is used instead of the value stored
  in the Data Protection for SQL configuration file. Specifying this
  parameter does not change the value in the configuration file.
• If you specify /sqlbuffersize but not sqlbuffersizeinkb, the default value
  1024 is used.

/SQLPassword=sqlpasswordname
This parameter specifies the SQL password that Data Protection for SQL
uses to log on to the SQL server that objects are backed up from or
restored to.

Considerations:
• Using this parameter means that you are using SQL Server
  authentication. The SQL Server and the SQL user id for this password
  must both be configured for SQL Server authentication.
• If you do not specify /sqlpassword, the default value is blank (" ").
• If you specify /sqlpassword but not sqlpasswordname, the default is also
  blank (" ").
Note: This parameter is ignored if you use the /sqlauth=integrated parameter with it.

/SQLSERVER=sqlprotocol:sqlservername

The /sqlserver parameter specifies the SQL server that Data Protection for SQL logs on to. For restore operations, this is the SQL server that backup objects are restored to. However, if the backup objects were created from a different SQL server name, you must use the /fromsqlserver parameter. Use /sqlserver for the query SQL and backup commands, but use /fromsqlserver for the query TSM and inactivate commands. The sqlprotocol variable specifies the communication protocol to use. You can specify one of the following protocols:

- lpc: Use Shared Memory protocol.
- np: Use Named Pipes protocol.
- tcp: Use Transmission Control protocol.
- via: Use Virtual Interface Architecture protocol.

If no protocol is specified, Data Protection for SQL logs on to the SQL server according to the first protocol that becomes available.

Considerations:

- The default value is the value specified by the SQL server configurable option in the Data Protection for SQL configuration file. This is initially the local computer name.
- If you specify /sqlserver but not sqlservername, the local computer name is used.
- The following two shortcuts are accepted as the local computer name: (local) These are a period or the word local within parentheses.
- If the SQL server is a member of a fail-over cluster, the CLUSTERNODE option in the Tivoli Storage Manager options file must have the value YES.
- You must specify the name if the SQL server is not the default instance or is a member of a fail-over cluster.
- The format of sqlservername depends on what type of instance it is and whether it is clustered or not:

<table>
<thead>
<tr>
<th>Format</th>
<th>Instance?</th>
<th>Clustered?</th>
<th>Name required?</th>
</tr>
</thead>
<tbody>
<tr>
<td>local-computername</td>
<td>default</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>local-computername\instancename</td>
<td>named</td>
<td>no</td>
<td>yes</td>
</tr>
<tr>
<td>virtualservername</td>
<td>default</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>virtualservername\instancename</td>
<td>named</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>

localcomputername

The network computer name of the computer the SQL server and Data Protection for SQL reside on. The TCP/IP host name may not always be the same.

instancename

The name given to the named instance of SQL Server specified during installation of the instance.
**virtualservername**

The name given to the clustered SQL Server specified during clustering service setup. This is not the cluster or node name.

**/SQLUSer=sqlusername**

The `/sqluser` parameter specifies the name that Data Protection for SQL uses to log on to the SQL server.

**Considerations:**

- Using this parameter means that you are using SQL Server authentication. The SQL Server and the SQL user id for this password must both be configured for SQL Server authentication.
- The SQL user id must have the SQL server SYSADMIN fixed server role.
- If you do not specify `/sqluser`, the default is `sa`.
- If you specify `/sqluser` but not `sqlusername`, the default is also `sa`.

**Note:** This parameter is ignored if you use the `/sqlauth=integrated` parameter with it.

**/STANDby=undofilename**

Specifies that the restore is to a standby SQL server, and specifies the name of an undo file.

**Considerations:**

- You cannot specify more than one database name as the restore command value.
- A standby SQL server can be in read-only mode between restores and can accept additional restores to its databases.
- You can use the same undo file for a database for each restore to the database, but you cannot use a single undo file for more than one database.
- The `undofilename` variable can include a fully qualified path. However, if a fully qualified path is not specified, the undo file is created in the directory specified by the `%TEMP%` environment variable.
- If `undofilename` includes spaces, you must enclose it in double quotes.
- If the specified undo file does not exist, SQL server creates it. If the file exists but was not used for the same SQL database, SQL Server overwrites it.
- If you specify neither `/recovery` nor `/standby`, the default is `/recovery=yes`.

**/STOPAT=DATETIME**

For `restore` operations, `/stopat` specifies the point in time that you restore a SQL database to. Only transaction logs written before the point in time are applied to the SQL database. The `datetime` variable specifies both the date and time separated by a space. Use any valid date and time format accepted by SQL Server.

**Considerations:**

- This parameter applies only to transaction log restores, but the base restore that the transaction logs apply to must have been a `full` database restore. You cannot restore `file`, `group`, and `set` restores to a point in time.
- You cannot also specify `/recovery=no` or `/standby` with the `/stopat` parameter.
Because *datetime* includes a space, you must enclose it in double quotes.

- If the restore operation with the `/stopat` parameter does not encounter a transaction in the restored transaction log that has a time stamp equal to or greater than the specified point in time, the SQL database is left in an unrecovered state, even if you also specify `/recovery=yes`.

### /STOPATMark=markname [/AFTER=datetime]

The `/stopatmark` parameter specifies a named point in time to restore a database to. This can be after a specified point in time if you specify the `/after` option. Only transaction log records written *up to* and including the named transaction (which may be found at or after the specified point in time) are applied to the SQL database. The *markname* variable specifies the name of a SQL transaction. The SQL transaction may be a local transaction or a distributed transaction. If it is a distributed transaction name, the named mark exists in the transaction log of each SQL database participating in the distributed transaction.

**Note:** *markname* is the transaction name, not the description that follows the MARK keyword in a SQL BEGIN TRANSACTION or BEGIN DISTRIBUTED TRANSACTION statement.

The *datetime* variable specifies both the date and time separated by a space. Use any valid date and time format accepted by SQL Server.

**Considerations:**
- This parameter applies only to transaction log restores. The base restore that the transaction logs apply to must have been a *full* database restore. You cannot restore *file, group, and set* restores to a mark.
- You can use the same named mark for several SQL transactions.
- If you do not specify `/after`, the restore stops at the first mark it encounters with the specified name.
- If you specify `/after`, the restore stops at the first mark it encounters with the specified name *after* the specified date and time.
- If `markname` includes spaces, you must enclose it in double quotes.
- You cannot use a Data Protection for SQL *restore* command with `/stopatmark` and also specify `/recovery=no` or `/standby`.
- If the restore operation with `/stopatmark` does not encounter a transaction in the restored transaction log to stop at, the SQL database is left in an unrecovered state, even if you also specify `/recovery=yes`.

### /STOPBEFOREMark=markname [/AFTER=datetime]

This parameter specifies a named point in time to restore a database to. This can be after a specified point in time if you specify the `/after` option. Only transaction log records written *before* and not including the named transaction (which may be found at or after the specified point in time) are applied to the SQL database. The *markname* variable specifies the name of a SQL transaction. The SQL transaction may be a local transaction or a distributed transaction. If it is a distributed transaction name, the named mark exists in the transaction log of each SQL database participating in the distributed transaction.

**Note:** *markname* is the transaction name, not the description that follows the MARK keyword in a SQL BEGIN TRANSACTION or BEGIN DISTRIBUTED TRANSACTION statement.

The *datetime* variable specifies both the date and time separated by a space. Use any valid date and time format accepted by SQL Server.

**Considerations:**
This parameter applies only to transaction log restores. The base restore that the transaction logs apply to must have been a full database restore.
You cannot restore file, group, and set restores to a mark.

You can use the same named mark for several SQL transactions.

If you do not specify /after, the restore stops before the first mark it encounters with the specified name.

If you specify /after, the restore stops before the first mark it encounters with the specified name, or after the specified date and time.

If markname includes spaces, you must enclose it in double quotes.

You can not use a Data Protection for SQL restore command with /stopbeforemark and also specify /recovery=no or /standby.

If the restore operation with /stopbeforemark does not encounter a transaction in the restored transaction log to stop before, the SQL database is left in an unrecovered state, even if you also specify /recovery=yes.

/STRIPes=numstripes
The /stripes parameter specifies the number of data stripes to use in a backup or restore operation. The numstripes variable can range from 1 to 64.

Considerations:

- If you do not specify /stripes, the default value is that specified in the Data Protection for SQL configuration file. The initial value is 1. For restore, the value is the same as that used in the backup operation.
- If you specify /stripes but not numstripes, the stored value is used.
- You may use up to the number used to create the backup. You can determine the number of data stripes used to create a backup object with the Data Protection for SQL command: query tsm dbname backup_object
- You must use the MAXNUMMP parameter on a Tivoli Storage Manager REGISTER NODE or UPDATE NODE command to allow a node to use multiple sessions to store data on removable media (which requires you to allocate multiple mount points to that node). The MAXNUMMP value must be equal to or less than the maximum number of stripes you desire.
- When you use data striping, you should use Tivoli Storage Manager server file space collocation to try to keep each stripe on a different storage volume.
- The maximum number of data stripes you can use is one less than the value of the Tivoli Storage Manager server TXNGROUPMAX option in the dsmserc.opt file. SQL server allows a maximum of 64 data stripes.

/TSMNODE=tsmnodename
The /tsmnode parameter specifies the Tivoli Storage Manager node name that Data Protection for SQL uses to log on to the Tivoli Storage Manager server. This identifies which Tivoli Storage Manager client is requesting services. You can also store the node name in the options file. The command line parameter overrides the value in the options file.

Considerations:

- You cannot use the /tsmnode parameter if PASSWORDACCESS GENERATE is specified in the Tivoli Storage Manager options file. You must specify the nodename in the options file. Otherwise, you can change PASSWORDACCESS to PROMPT to utilize the /tsmnode
parameter. For details about the Tivoli Storage Manager options file, see the reference manual IBM Tivoli Storage Manager for Windows Backup-Archive Client Installation and User’s Guide.

- If you do not specify /tsmnode, the default value is that specified by the nodename option in the Tivoli Storage Manager options file. Specifying this parameter does not change the value in the options file.

/TSMOPTFile=dsmoptfilename

The /tsmoptfile parameter specifies the Tivoli Storage Manager options file to use. This is similar to selecting a Tivoli Storage Manager server from the server list in the GUI. The Tivoli Storage Manager options file contains the configuration values for the Tivoli Storage Manager API. For details about the Tivoli Storage Manager options file, see the reference manual IBM Tivoli Storage Manager for Windows Backup-Archive Client Installation and User’s Guide.

Considerations:
- The tsmoptfilename variable can include a fully qualified path. If you do not include a path, the directory where Data Protection for SQL is installed is used.
- If tsmoptfilename includes spaces, you must enclose it in double quotes.
- If you do not specify /tsmoptfile, the default value is dsm.opt.
- If you specify /tsmoptfile but not tsmoptfilename, the default is also dsm.opt.

/TSMPassword=tsmpasswordname

The /tsmpassword parameter specifies the Tivoli Storage Manager password that Data Protection for SQL uses to log on to the Tivoli Storage Manager server. This parameter and the option PASSWORDACCESS in the Tivoli Storage Manager options file interact in the following ways:

<table>
<thead>
<tr>
<th>/tsmpassword</th>
<th>PASSWORDACCESS in Tivoli Storage Manager options file</th>
<th>Password already stored in registry?</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>specified</td>
<td>generate</td>
<td>yes</td>
<td>/tsmpassword ignored</td>
</tr>
<tr>
<td>specified</td>
<td>generate</td>
<td>no</td>
<td>/tsmpassword used and stored</td>
</tr>
<tr>
<td>specified</td>
<td>prompt</td>
<td>—</td>
<td>/tsmpassword used</td>
</tr>
<tr>
<td>not specified</td>
<td>prompt</td>
<td>—</td>
<td>user is prompted</td>
</tr>
</tbody>
</table>

Legacy Restore output examples

These output examples provide a sample of the text, messages, and process status that displays when using the restore command.

Legacy Restore 1–Full

Legacy Restore 1 displays restoring a full backup object of database Test1 to a different server than that from which it was backed up.

Command:

```
tdpsqlc restore Test1 full /fromsqlserver=rbtest07\rbtest07_2010
```

Output:
Legacy Restore 2–Differential

Legacy Restore 2 displays restoring a differential backup object of database Test1 into database Test2. Note that the Test2 database must already exist for the restore to be successful.

Command:

tdpsqlc restore Test1 diff /into=Test2

Output:

IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Starting Sql database restore...

Querying Tivoli Storage Manager server for a list of database backups, please wait...

Beginning difffull restore of backup object Test1, 1 of 1, to database Test2
Full: 0  Read: 478720  Written: 478720  Rate: 40.62 Kb/Sec
Restore of Test1 completed successfully.

Total database backups inspected: 1
Total database backups requested for restore: 1
Total database backups restored: 1
Total database skipped: 0

Throughput rate: 40.61 Kb/Sec
Total bytes transferred: 478,720
Elapsed processing time: 11.51 Secs

Legacy Restore 3–Group

Legacy Restore 3 displays restoring a file group backup object named Group1 to database Test1.

Command:

tdpsqlc restore Test1 group=Group1
Legacy Restore 4–Set

Legacy Restore 4 displays restoring all active set backup objects to database *Test1*.

Command:
```
tdpsqlc restore Test1 set=* 
```

Output:
```
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Starting Sql database restore...

Querying Tivoli Storage Manager server for a list of database backups, please wait...

Restoring meta data ...

Beginning group restore of backup object Test1\Group1, 1 of 1, to database Test1
Full: 0  Read: 86982144  Written: 86982144  Rate: 8,188.11 Kb/Sec
Restore of Test1\Group1 completed successfully.

Total database backups inspected: 1
Total database backups requested for restore: 1
Total database backups restored: 1
Total database skipped: 0

Throughput rate: 8,185.75 Kb/Sec
Total bytes transferred: 86,982,144
Elapsed processing time: 10.38 Secs
```

Legacy Restore 5–Log (point in time)

Legacy Restore 5 displays restoring all active log backup objects of database *Test1* to a specified point in time. Three of four log backups meet the datetime criteria.
Command:

tdpsqlc restore Test1 log=* /stopat="07/01/2010 13:56:00"

Output:

IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Starting Sql database restore...

Querying Tivoli Storage Manager server for a list of
database backups, please wait...

Beginning log restore of backup object Test1\20100701135511\00000700,
1 of 4, to database Test1
Full: 0 Read: 214528 Written: 214528 Rate: 59.75 Kb/Sec
Restore of Test1\20100701135511\00000700 completed successfully.

Beginning log restore of backup object Test1\20100701135605\00000700,
2 of 4, to database Test1
Full: 0 Read: 147968 Written: 147968 Rate: 32.15 Kb/Sec
Restore of Test1\20100701135605\00000700 completed successfully.

Beginning log restore of backup object Test1\20100701135712\00000700,
3 of 4, to database Test1
Full: 0 Read: 0 Written: 0 Rate: 0.00 Kb/Sec
Restore of Test1\20100701135712\00000700 completed successfully.

Skipping Test1\20100701135817\00000700
because of the preceding failure or point-in-time recovery.

Total database backups inspected: 4
Total database backups requested for restore: 4
Total database backups restored: 3
Total database skipped: 1

Throughput rate: 37.21 Kb/Sec
Total bytes transferred: 362,496
Elapsed processing time: 9.51 Secs

Legacy Restore 6–Log (named mark)

Legacy Restore 6 displays restoring all active log backup objects to database
Testmark to a named point in time. The first mark with the specified name, mark2,
is encountered in the third log backup object applied to the restore. The restore
stops once this mark is encountered.

Command:

tdpsqlc restore Testmark log=* /stopatmark=mark2

Output:
Legacy Restore 7–Log (inactive object)

Legacy Restore 7 begins with a query to display both active and inactive log backup objects for database Test1.

Command:
```
tdpsqlc q tsm Test1 log=* /all
```

Output:
The restore operation for Legacy Restore 7 applies a specifically named inactive log backup object of database Test1 to the restore. Since an inactive log backup object is being requested, the /object parameter must be used on the restore command.

Command:
```
tdpsqlc restore Test1 log=* /object=20100622135511\00000700
```

Output:
Legacy Restore 8–Full (partial)

Legacy Restore 8 displays restoring part of a full backup object, file group *Group1*, to database *Test1*.

**Command:**

```
tdpsqlc restore Test1 full /partial /gr=Group1
```

**Output:**

```
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Starting Sql database restore...

Querying Tivoli Storage Manager server for a list of database backups, please wait...

Beginning log restore of backup object Test1\20100622135511\00000700, 1 of 1, to database Test1
Full: 0  Read: 214528  Written: 214528  Rate: 29.47 Kb/Sec
Restore of Test1\20100622135511\00000700 completed successfully.

Total database backups inspected: 1
Total database backups requested for restore: 1
Total database backups restored: 1
Total database skipped: 0
Throughput rate: 29.46 Kb/Sec
Total bytes transferred: 214,528
Elapsed processing time: 7.11 Secs
```

Legacy Restore 9–Full (relocate)

Legacy Restore 9 displays restoring a full backup object of database *Test1*, specifically relocating logical file *File1Group1* to a new physical location.

**Command:**

```
158
```
tdpsqlc restore Test1 full /relocate=File1Group1
/to=e:\sqldata\File1Group1.NDF

Output:

IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Starting Sql database restore...

Querying Tivoli Storage Manager server for a list of database backups, please wait...

Restoring meta data ...

Beginning full restore of backup object Test1, 1 of 1, to database Test1
Full: 0  Read: 88100352  Written: 88100352  Rate: 3,930.18 Kb/Sec
Restore of Test1 completed successfully.

Total database backups inspected: 1
Total database backups requested for restore: 1
Total database backups restored: 1
Total database skipped: 0

Throughput rate: 3,929.64 Kb/Sec
Total bytes transferred: 88,100,352
Elapsed processing time: 21.89 Secs

VSS Restore output examples

These output examples provide a sample of the text, messages, and process status that displays when using the restore command.

VSS Restore 1– from TSM

VSS Restore 1 restores database netapp_db2 from Tivoli Storage Manager server storage using the new optional parameters, /backupdestination and /backupmethod.

Command:

    tdpsqlc restore netapp_db2 full /backupdestination=tsm
    /backupmethod=vss

Output:
VSS Restore 2– from TSM

VSS Restore 2 restores databases AdventureWorks and AdventureWorksDW from Tivoli Storage Manager server storage using the new optional parameters, /backupdestination and /backupmethod.

Command:

```
tdpsqlc restore AdventureWorks,AdventureWorksDW full /backupdestination=tsm /backupmethod=vss
```

Output:

```
VSS Restore operation completed with rc = 0
Files Examined : 27
Files Completed : 27
Files Failed : 0
Total Bytes : 95326562
```

VSS Restore 3– from local

VSS Restore 3 restores database AdventureWorks from local shadow volumes using the new optional parameters, /backupdestination and /backupmethod.

```
VSS Restore operation completed with rc = 0
Files Examined : 27
Files Completed : 27
Files Failed : 0
Total Bytes : 95326562
```
Command:
```
tdpsqlc restore AdventureWorks full /backupdestination=local /backupmethod=vss /instantrestore=no
```

Output:
```
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.
Connecting to SQL Server, please wait...
Querying TSM Server for Backups ....
Starting Sql database restore...
Beginning VSS restore of 'DEMODB'...
Files Examined/Completed/Failed: [2 / 2 / 0] Total Bytes: 5243190
VSS Restore operation completed with rc = 0
Files Examined : 2
Files Completed : 2
Files Failed : 0
Total Bytes : 5243190
```

VSS Restore 4 – Instant Restore from local

VSS Restore 4 performs an Instant Restore of database testdb2 from local shadow volumes using the new /instantrestore parameter.

Command:
```
tdpsqlc restore testdb2 /backupmethod=vss /backupdest=local /instantrestore=yes
```

Output:
```
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.
Connecting to SQL Server, please wait...
Querying TSM Server for Backups ....
Starting Sql database restore...
Beginning VSS restore of 'DEMODB'...
Restoring 'DEMODB' using volume-level-copy snapshot.
Starting snapshot restore process. This process may take several minutes.
VSS Restore operation completed with rc = 0
Files Examined : 0
Files Completed : 0
Files Failed : 0
Total Bytes : 0
```
VSS Restore 5– Relocate Directory

VSS Restore 5 restores (and relocates) database *svtdb* from Tivoli Storage Manager server storage to directory *m:\svtdb* using the new optional parameter, */relocatedir*. All SQL logs and full-text index files associated with database *svtdb* are also restored and relocated.

**Command:**

```bash
tdpsqlc restore svtdb full /relocatedir=m:\svtdb /backupdestination=tsm /backupmethod=vss
```

**Output:**

```
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Connecting to SQL Server, please wait...
Querying TSM Server for Backups ....
Starting Sql database restore...

Beginning VSS restore of 'svtdb'...

Preparing for restore of 'svtdb' from TSM backup.
Files Examined/Completed/Failed: [5 / 5 / 0] Total Bytes: 418328259

VSS Restore operation completed with rc = 0
Files Examined : 5
Files Completed : 5
Files Failed : 0
Total Bytes : 418328259
```

In order to restore (and relocate) the database *svtdb*, its logs, and its full-text index files into their own respective locations, the following command is issued:

```bash
tdpsqlc restore svtdb full /relocatedir=m:\svtdb,e:\svtdb,f:\svtdb /backupdestination=tsm /backupmethod=vss
```

The */relocatedir* values in this command are as follows:

- *m:\svtdb*: The directory where only the *svtdb* database is relocated.
- *e:\svtdb*: The directory where only the *svtdb* logs are relocated.
- *f:\svtdb*: The directory where only the *svtdb* full-text index files are relocated.

### Delete Backup command

Use the **delete backup** command to delete a VSS Backup of a SQL Server database.

You must have local registry rights (for all versions of SQL Server) to perform a Data Protection for SQL delete backup.
Delete Backup syntax

Use the delete backup command syntax diagrams as a reference to view available options and truncation requirements.

Delete Backup positional parameters

Positional parameters immediately follow the delete backup command and precede the optional parameters.

The following positional parameters specify the backup to delete:

* 1 dbname

  * Delete the active backups of all databases.

dbname

  Delete a backup of the specified database. The active backup is deleted unless you specify a different backup with the /object optional parameter.

  Multiple entries are separated by commas. If separated by commas, make sure there is no space between the comma and the database name. If any database name contains commas or blanks, enclose the database name in double quotation marks.

The following positional parameter specifies the type of delete backup to perform:

FULL  Delete full type backups.

CAUTION:

* Be careful to delete only the desired backups.
Delete Backup optional parameters

Optional parameters follow the delete backup command and positional parameters.

/CONFIGfile=configfilename
Use the /configfile parameter to specify the name (configfilename) of the Data Protection for SQL configuration file that contains the values to use for a delete backup operation.

The configfilename variable can include a fully qualified path. If the configfilename variable does not include a path, the Data Protection for SQL installation directory is used. If the /configfile parameter is not specified, or if the configfilename variable is not specified, the default value is tdpsql.cfg.

If the configfilename variable includes spaces, enclose the entire /configfile parameter entry in double quotation marks. For example:

```
/CONFIGfile="c:\Program Files\file.cfg"
```

See “Set positional parameters” on page 178 for descriptions of available configuration parameters.

/FROMSQLSERVer=server-name
Use the /fromsqlserver parameter to specify the name of the SQL Server where the original backup was performed. This parameter is necessary only when the name of the SQL server to delete from, as determined by the /sqlserver parameter, is different from the name of the SQL server that the backup objects were created from. The default value is the /sqlserver value or the value set in the Data Protection for SQL configuration file.

Considerations:
• If the two SQL server names are different, you must use this parameter even if /fromsqlserver was a non-clustered default instance.

/LOGFile=logfilename
Use the /logfile parameter to specify the name of the activity log file that is generated by Data Protection for SQL.

The logfilename variable identifies the name of the activity log file.

If the specified log file does not exist, a new log file is created. If the specified log file exists, new log entries are appended to the file. The logfilename variable can include a fully-qualified path. However, if no path is specified, the log file is written to the Data Protection for SQL installation directory.

If the logfilename variable includes spaces, enclose the entire /logfile parameter entry in double quotation marks. For example:

```
/LOGFile="c:\Program Files\mytdpsql.log"
```

If the /logfile parameter is not specified, log records are written to the default log file, tdpsql.log.

The /logfile parameter cannot be turned off, logging always occurs.

When using multiple simultaneous instances of Data Protection for SQL to perform operations, use the /logfile parameter to specify a different log file for each instance used. This directs logging for each instance to a different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.
/LOGPrune=numdays | No

Use the `logprune` parameter to disable log pruning or to explicitly request that the log be pruned for one command run. By default, log pruning is enabled and performed once per day. The `numdays` variable represents the number of days to save log entries. By default, 60 days of log entries are saved in the pruning process. You can use the Data Protection for SQL GUI or the `set` command to change the defaults so that log pruning is disabled, or so that more or less days of log entries are saved. If you use the command line, you can use the `/logprune` parameter to override these defaults. When the value of the `/logprune` variable `numdays` is a number in the range 0 to 9999, the log is pruned even if log pruning has already been performed for the day.

Changes to the value of the `timeformat` or `dateformat` parameter can result in the log file being pruned unintentionally. If the value of the `timeformat` or `dateformat` parameter has changed, prior to issuing a Data Protection for SQL command that might prune the log file, perform one of the following actions to prevent the log file from being pruned:

- Make a copy of the existing log file.
- Specify a new log file with the `/logfile` parameter or `logfile` setting.

/OBJECT=objectname,...

Use the `object` parameter to specify the names of backup objects you want to delete. The object name uniquely identifies each backup object and is created by Data Protection for SQL.

Use the Data Protection for SQL `query tsm * /all` command to view the names of all available backup objects. This parameter specifies that only particular backup objects for the specified SQL databases and backup object type be deleted. The `objectname` variable specifies the names of the backup objects you want to delete. The object name uniquely identifies each backup object and is created by Data Protection for SQL.

/Quiet This parameter prevents status information from being displayed. This does not affect the level of information written to the activity log.

Delete Backup example

This output example provides a sample of the text, messages, and process status that displays when using the `delete backup` command.

In this example, the `tdpsqlc delete backup xivdb1 full` command deletes a full backup of database xivdb1. The following output is displayed:

```
Connecting to SQL Server, please wait...

Querying for Backups ....
Backup(s) to be deleted:
  <xivdb1 : VSS : full : 02/10/2010 10:03:29>
VSS Delete backup operation completed with rc = 0
Files Examined : 1
Files Completed : 1
Files Failed : 0
Total Bytes : 0
```
Inactivate command (Legacy only)

Use the `inactivate` command to inactivate one or more active Legacy backup objects on the Tivoli Storage Manager server.

Most backup objects are automatically inactivated as part of the normally scheduled backup processing. For those occasions when that processing is not sufficient, you can use the `inactivate` command.

Tivoli Storage Manager server does not delete active backup objects from Tivoli Storage Manager managed storage; it will delete only inactive backup objects. Once a backup object becomes inactive, the expiration processing defined in the object's management class determines exactly when the backup object is deleted.

Inactivate syntax

Use the `inactivate` command syntax diagrams as a reference to view available options and truncation requirements.

Syntax

```
TDPSQLC-INACTIVATE [dbname] [File=logicalfilename] [FULL] [DIFFerential] [Group=groupname] [Log=logobjectname] [Set=setobjectname]
```
Inactivate positional parameters

Positional parameters immediately follow the `inactivate` command and precede the optional parameters.

`File=*logicalfilename,`...

This option inactivates only the active file backup objects for the SQL databases you specify. The `logicalfilename` variable specifies the names of the SQL server database logical files you want to inactivate.

Considerations:
- You can specify this parameter more than once per command invocation.
- Use `*` as a wildcard character in `logicalfilename` to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all logical files in the SQL server database.
- If `logicalfilename` includes spaces or special characters, enclose it in double quotes.
- The `logicalfilename` variable is case-sensitive.

FULL

This option inactivates only the active full database backup objects for the SQL databases you specify. Each SQL database backed up creates a separate backup object on the Tivoli Storage Manager server. A new full database backup object inactivates all prior active backup objects for the same SQL database. This inactivation includes any active full backup object as well as any active file, group, set, differential, and log backup objects.

DIFFerential

This option inactivates only the active differential database backup object. Because each SQL database backup creates a separate backup object on the Tivoli Storage Manager server, a new differential database backup object inactivates any active differential backup object for the same SQL database. Use this option so that all individual log backups since the last full database backup do not need to be applied.

Group=*`groupname`,...

This option inactivates only the active group database backup object for the SQL database you specify. The `groupname` variable specifies the names of the SQL server database file groups you want to inactivate.
Considerations:
- You can specify this parameter more than once per command invocation.
- Use * as a wildcard character in the groupname variable to replace zero or more characters for each occurrence.
- Specifying only the wildcard character indicates all file groups in the SQL server database.
- If the groupname variable includes spaces or special characters, enclose it in double quotes.
- The groupname variable is case-sensitive.

Log or Log=*|logobjectname,...
This option inactivates only the active log database backup object for the SQL database you specify. This parameter takes the wildcard or logobjectname value. The logobjectname variable specifies the log backup objects to inactivate. Use * as a wildcard character in logobjectname to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all log backup objects for the SQL databases. You can specify this parameter more than once per command invocation.

Set or Set=*|setobjectname,...
This option inactivates only the active set database backup object for the SQL database you specify. This parameter takes the wildcard or setobjectname value. The setobjectname variable specifies the set backup objects to inactivate. Use * as a wildcard character in setobjectname to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all set backup objects for the SQL databases. You can specify this parameter more than once per command invocation.

Inactivate optional parameters
Optional parameters follow the inactivate command and positional parameters.

The following are detailed descriptions of each of the optional parameters:

/CONFIGfile=configfilename
The /configfile parameter specifies the name of the Data Protection for SQL configuration file, which contains the values for the Data Protection for SQL configurable options. See "Set command" on page 177 for details on the file's contents.

Considerations:
- configfilename can include a fully qualified path. If configfilename does not include a path, it uses the directory where Data Protection for SQL is installed.
- If configfilename includes spaces, place it in double quotes.
- If you do not specify /configfile, the default value is tdpsql.cfg.
- If you specify /configfile but not configfilename, the default value tdpsql.cfg is used.

/FROMSQLSERVER=sqlservername
The /fromsqlserver parameter specifies the SQL server that backup objects were backed up from. This parameter is necessary only when the name of the SQL server to inactivate from, as determined by the /sqlserver parameter, is different from the name of the SQL server that the backup objects were created from. The default value is the /sqlserver value or the value set in the Data Protection for SQL configuration file. If the two SQL
server names are different, you must use this parameter even if
/fromsqlserver was a non-clustered default instance.

/LOGFile=logfile

The /logfile parameter specifies the name of the activity log that is
generated by Data Protection for SQL. This activity log records significant
events such as completed commands and error messages. The Data
Protection for SQL activity log is distinct from the SQL Server error log.
The logfile variable identifies the name to be used for the activity log
generated by Data Protection for SQL.

Considerations:
• If the specified file does not exist, it is created. If it does exist, new log
  entries are appended to the file.
• The file name can include a fully-qualified path; however, if you specify
  no path, the file is written to the directory where Data Protection for
  SQL is installed.
• You cannot turn Data Protection for SQL activity logging off. If you do
  not specify /logfile, log records are written to the default log file. The
  default log file is tdpsql.log.
• When using multiple simultaneous instances of Data Protection for SQL
to perform operations, use the /logfile parameter to specify a different
log file for each instance used. This directs logging for each instance to a
different log file and prevents interspersed log file records. Failure to
specify a different log file for each instance can result in unreadable log
files.

/LOGPrune=numdays l No

The /logprune parameter prunes the Data Protection for SQL activity log
and specifies how many days of entries are saved. By default, log pruning
is enabled and performed once each day Data Protection for SQL is
executed; however, this option allows you to disable log pruning or
explicitly request a prune of the log for one command run even if the log
file has already been pruned for the day. The numdays variable represents
the number of days to save log entries. By default, 60 days of log entries
are saved in the prune process.

Considerations:
• If you specify numdays, it can range from 0 to 9999. A value of 0 deletes
  all entries in the Data Protection for SQL activity log file except for the
current command entries.
• If you specify no, the log file is not pruned during this command.
• If you do not specify /logprune, the default value is that specified by the
  logprune configurable option in the Data Protection for SQL
  configuration file. This is initially 60.
• If you specify /logprune, its value is used instead of the value stored in
  the Data Protection for SQL configuration file. Specifying this parameter
does not change the value in the configuration file.
• You can specify /logprune without specifying numdays or no; in this
  case, the default 60 is used.
• Changes to the value of the timeformat or dateformat parameter can
result in an undesired pruning of the &agentname; log file. If you are
running a command that may prune the log file and the value of the
timeformat or dateformat parameter has changed, perform one of the
following to prevent undesired pruning of the log file:

Chapter 5. Command line interface  169
- Make a copy of the existing log file.
- Specify a new log file with the /logfile parameter or logfile setting.

/Objec=*\|\|objectname, ...
This parameter specifies that only particular backup objects for the specified SQL databases and backup object type (if specified) be inactivated. The objectname variable specifies the names of the backup objects you want to inactivate. The object name uniquely identifies each backup object and is created by Data Protection for SQL. Use query to view the names of backup objects. You can use * as a wildcard character in objectname to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all backup objects of the specified SQL databases and backup object type.

/Olderen=\|\|numdaysold
This parameter specifies how old a backup object must be before the command can inactivate it.

Considerations:
- The numdaysold variable can range from 0 to 9999.
- If you specify 0, you inactivate all selected backup objects.
- If you specify 1, you inactivate all selected backup objects created prior to the current date. Any part of a day counts as a whole day.
- There is no default value for /olderen.

/Quiet The /quiet parameter omits displaying status information from the command. However, the information is appended to the Data Protection for SQL activity log.

/TSMNode=\|\|tsmnodename
The /tsmnode parameter specifies the Tivoli Storage Manager node name that Data Protection for SQL uses to log on to the Tivoli Storage Manager server. This identifies which Tivoli Storage Manager client is requesting services. You can also store the node name in the options file. The command line parameter overrides the value in the options file.

Considerations:
- You cannot use the /tsmnode parameter if PASSWORDACCESS GENERATE is specified in the Tivoli Storage Manager options file. You must specify the nodename in the options file. Otherwise, you can change PASSWORDACCESS to PROMPT to utilize the /tsmnode parameter. For details about the Tivoli Storage Manager options file, see the reference manual IBM Tivoli Storage Manager for Windows Backup-Archive Client Installation and User’s Guide.
- If you do not specify /tsmnode, the default value is that specified by the nodename option in the Tivoli Storage Manager options file. Specifying this parameter does not change the value in the options file.

/TSMOptFile=\|\|dsmoptfilename
The /tsmoptfile parameter specifies the Tivoli Storage Manager options file to use. This is similar to selecting a Tivoli Storage Manager server from the server list in the GUI. The Tivoli Storage Manager options file contains the configuration values for the Tivoli Storage Manager API. For details about the Tivoli Storage Manager options file, see the reference manual IBM Tivoli Storage Manager for Windows Backup-Archive Client Installation and User’s Guide.

Considerations:
The \textit{tsmoptfilename} variable can include a fully qualified path. If you do not include a path, the directory where Data Protection for SQL is installed is used.

- If \textit{tsmoptfilename} includes spaces, you must enclose it in double quotes.
- If you do not specify \textit{tsmoptfile}, the default value is \textit{dsm.opt}.
- If you specify \textit{tsmoptfile} but not \textit{tsmoptfilename}, the default is also \textit{dsm.opt}.

\textit{TSMPassword=tsmpasswordname}

The \textit{TSMPassword} parameter specifies the Tivoli Storage Manager password that Data Protection for SQL uses to log on to the Tivoli Storage Manager server. This parameter and the option \textit{PASSWORDACCESS} in the Tivoli Storage Manager options file interact in the following ways:

<table>
<thead>
<tr>
<th>/tsmpassword</th>
<th>PASSWORDACCESS in Tivoli Storage Manager options file</th>
<th>Password already stored in registry?</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>specified</td>
<td>generate</td>
<td>yes</td>
<td>/tsmpassword ignored</td>
</tr>
<tr>
<td>specified</td>
<td>generate</td>
<td>no</td>
<td>/tsmpassword used</td>
</tr>
<tr>
<td>specified</td>
<td>prompt</td>
<td>—</td>
<td>/tsmpassword used</td>
</tr>
<tr>
<td>not specified</td>
<td>prompt</td>
<td>—</td>
<td>user is prompted</td>
</tr>
</tbody>
</table>

\textbf{Inactivate output examples}

These output examples provide a sample of the text, messages, and process status that displays when using the \textbf{inactivate} command.

The following operation explicitly inactivates database backup objects. Once a backup object is inactivated, it will expire automatically according to retention policy. In this case, the objects were backed up from a different SQL server. First, a query is performed to display status information such as active state and backup date.

\textbf{Command:}

\begin{verbatim}
tdpsq1c query tsm test1,test2 * /fromsqlserv=mutalisk
\end{verbatim}

\textbf{Output:}

\begin{verbatim}
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.
Backup Object Information
-------------------------
SQL Server Name .......... MUTALISK
SQL Database Name .......... test1
Backup Object Type .......... Full
Backup Object State .......... Active
Backup Creation Date / Time .......... 06/17/2010 13:04:41
Backup Size .................. 2,209,512,960
Database Object Name .......... 20100617130441\0000012D
Number of stripes in backup object ...... 1

SQL Server Name .......... MUTALISK
SQL Database Name .......... test1
Backup Object Type .......... Log
\end{verbatim}
Backup Object State ...................... Active
Backup Creation Date / Time .............. 06/17/2010 15:26:59
Backup Size .............................. 92,672
Database Object Name ..................... 20100617152659\0000015F
Number of stripes in backup object ...... 1

SQL Server Name ........................ MUTALISK
SQL Database Name ........................ test2
Backup Object Type ....................... Full
Backup Object State ...................... Active
Backup Creation Date / Time .............. 06/17/2010 16:06:58
Backup Size .............................. 15,236,608
Database Object Name ..................... 20100617160658\00000163
Number of stripes in backup object ...... 1

The user then decides to inactivate all test1 database objects older than two weeks (older than November 28), of which there are two.

Command:
```
tdpsqlc inactiv test1 * /fromsqlserv=mutalisk /olderthan=14
```

Output:
```
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Starting Sql database backup inactivation...
Querying Tivoli Storage Manager server for a list of database backups, please wait...

Inactivating full backup test1
Inactivating log backup test1\20100617152659\0000015F

Total database backups inspected: 2
Total database backups requested for inactivation: 2
Total database backups inactivated: 2
Total database skipped: 0
Elapsed processing time: 1.26 Secs
```

Another Tivoli Storage Manager query displays the current status of these backup objects using the \textit{all} parameter; a full and a log backup of test1 are now both inactive.

Command:
```
tdpsqlc query tsm test1 /fromsqlserv=mutalisk /all
```

Output:
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

Backup Object Information
-------------------------
SQL Server Name ................. MUTALISK
SQL Database Name ............... test1
Backup Object Type .............. Full
Backup Object State ............. Inactive
Backup Creation Date / Time ..... 06/17/2010 13:04:41
Backup Size ..................... 2,209,512,960
Database Object Name ........... 20100617130441\0000012D
Number of stripes in backup object ... 1

SQL Server Name ................. MUTALISK
SQL Database Name ............... test1
Backup Object Type .............. Log
Backup Object State ............. Inactive
Backup Creation Date / Time ..... 06/17/2010 15:26:59
Backup Size ..................... 92,672
Database Object Name ........... 20100617152659\0000015F
Number of stripes in backup object ... 1

Help command
Use the help command to display the syntax of all or selected Data Protection for
SQL commands using a textual notation.

Help uses the following notation:

[a]  a is optional; a may occur zero or one time
[a | b] select either a or b, but not both
[a] +  a must occur at least one time
[a] *  a may occur zero or more times
(a)  comments that are not part of the command

UPPERCASE
minimum abbreviation (which you can also enter in lowercase)

Note: When using languages other than English, you might need to set the width
of your screen display to a value greater than 80 characters in order to view the
entire help description in one screen. For example, set the screen width to 100
characters.

Help syntax
Use the help command syntax diagrams as a reference to view available options
and truncation requirements.
Help positional parameters
Positional parameters immediately follow the help command. There are no optiona parameters with this command.

Use the help command to display the syntax of all or selected Data Protection for SQL commands using a textual notation.

Help uses the following notation:

[a] a is optional; a may occur zero or one time
[a | b] select either a or b, but not both
[a ]+ a must occur at least one time
[a ]* a may occur zero or more times
(a) comments that are not part of the command
UPPERCASE minimum abbreviation (which you can also enter in lowercase)

Help output examples
These output examples provide a sample of the text, messages, and process status that displays when using the help command.

Help 1-Query TSM
Command:

tdpsqlc help query tsm *

Output:
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

TDPSQLC Query TSM *|dbname[,dbname,...] [*]
  [/ACtive]
  [/ALl]
  [/BUFFers=numbuffers] default: 3 (or cfg value)
  [/BUFFERSize=buffersizeinkb] default: 1024 (or cfg value)
  [/COMPATibilityinfo]
  [/CONFIGfile=configfilename] default: tdpsql.cfg
  [/FROMSQLserver=sqlservername] default: sqlservername value (or cfg value)
  [/LOGFile=logfilename] default: tdpsql.log (or cfg value)
  [/LOGPrune=numdays|No] default: 60 (or cfg value)
  [/OBJECT=*|objectname[,objectname,...] [ ]]
  [/TSMNODe=tsmnodename] default: dsm.opt value
  [/TSMOPTFile=dsmoptfilename] default: dsm.opt
  [/TSMPassword=tsmpassword] default: dsm.opt value

Help 2-Restore Full
Command:
  tdpsqlc help rest full
Output:

IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

TDPSQLC Restore *|dbname[,dbname,...] [Full]
  [/BACKUPDESTination=TSM|LOCAL] default: TSM
  [/BACKUPMETHod=LEGACY|VSS] default: LEGACY
  [/BUFFers=numbuffers] default: 3 (or cfg value)
  [/BUFFERSize=buffersizeinkb] default: 1024 (or cfg value)
  [/CONFIGfile=configfilename] default: tdpsql.cfg
  [/FROMSQLserver=sqlservername] default: sqlservername value (or cfg value)
  [/LOGFile=logfilename] default: tdpsql.log (or cfg value)
  [/LOGPrune=numdays|No] default: 60 (or cfg value)
  [/MOUNTWait=Yes|No] default: Yes (or cfg value)
  [/OBJECT=*|objectname[,objectname,...] [ ]]
  [/QUALTimate=Yes|No] default: Yes
  [/RECOVery=Yes|No] default: Yes
  [/RELocate=lname /TO=pname [ /RELocate=lname /TO=pname ... ]]
  [/RELocate=dir=directory[,...],...]
  [/REPLACE]
  [/SQLAuthentication=INTegrated|SQLuserid] default: INTEGRATED (or cfg value)
  [/SQLBUFFers=numsqlbuffers] default: 0 (or cfg value)
  [/SQLBUFFERSize=sqlbuffersizeinkb] default: 1024 (or cfg value)
  [/SQLPassword=sqlpasswordname] default: " "
  [/SQLServer=sqlservername] default: sqlservername value (or cfg value)
  [/SQLUser=sqlusername] default: sa
  [/STANDby=undofilename]
  [/STRIPes=numstripes] default: 1 (or cfg value)
  [/TSMNODe=tsmnodename] default: dsm.opt value
  [/TSMOPTFile=dsmoptfilename] default: dsm.opt
  [/TSMPassword=tsmpassword] default: dsm.opt value

Help 3-Restore Log
Command:

tdpsqlc help rest log

Output:

IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

TDPSQLC Restore +]dbname[,dbname,...] Log=!logeobjectname[,logeobjectname,...]
[/BUFFers=numbuffers] default: 3 (or cfg value)
[/BUFFERSize=buffersizeinkb] default: 1024 (or cfg value)
[/CONFIGfile=configfilename] default: tdpsql.cfg
[/DBOonly]
[/FROMSQLserver=sqlservername] default: sqlserver value (or cfg value)
[/INTO=dbname]
[/LOGFile=logfilename] default: tdpsql.log (or cfg value)
[/LOGPrune=numdays|No] default: 60 (or cfg value)
[/MOUNTWait=Yes|No] default: Yes (or cfg value)
[/OBJect=*|objectname[,objectname,...]]
[/Quiet]
[/RECOVery=Yes|No] default: Yes
[/RELocate=lname /TO=pname [/RELocate=lname /TO=pname ...]]
[/SQLAUTHentication=INTegrated|SQLuserid] default: INTegrated (or cfg value)
[/SQLBUFFers=numsqlbuffers] default: 0 (or cfg value)
[/SQLBUFFersize=sqlbuffersizeinkb] default: 1024 (or cfg value)
[/SQLPassword=sqlpasswordname] default: **
[/SQLSERVER=[sqlprotocol:]sqlservername] default: local computer name (or cfg value)
[/SQLUSEr=sqlusername] default: sa
[/STANDby=undofilename]
[/STOPAT=datetimetime]
[/STOPATMark=markname [/AFTER=datetime]]
[/STOPBEFOREMark=markname [/AFTER=datetime]]
[/STRIPes=numstripes] default: 1 (or cfg value)
[/TSMNODE=tsmnode] default: dsm.opt value
[/TSMOPTFile=tsmoptfilename] default: dsm.opt
[/TSMPassword=tsmpassword] default: dsm.opt value

Help 4-Set

Command:

tdpsqlc help set

Output:
Use the set command to change the values for the Data Protection for SQL Configuration parameters and options.

Example:

```
SET BACKUPDESTINATION=LOCAL
```

**Parameter Descriptions:**
- **BACKUPDESTINATION:** [TSM|LOCAL|BOTH]
- **BACKUPMETHOD:** [LEGACY|VSS]
- **BUFFERS:** numbuffers (2..8)
- **BUFFERSIZE:** buffersize (64..8192)
- **DATEFORMAT:** dateformatnum
  - 1: MM/DD/YYYY
  - 2: DD-MM-YYYY
  - 3: YYYY-MM-DD
  - 4: DD.MM.YYYY
  - 5: YYYY.MM.DD
- **DIFFESTIMATE:** numpercent (1..99)
- **FROMSQLSERVER:** sqlservername
- **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:** logfilename
- **LOGPRUNE:** [numdays|No] (0..9999) | No
- **MOUNTWAITFORDATA:** [Yes|No]
- **NUMBERFORMAT:** numberformatnum
  - 1: n,nnn.dd
  - 2: n,nnn,dd
  - 3: n nnn,dd
  - 4: n nnn.dd
  - 5: n.nnn,dd
  - 6: n'nnn,dd
- **REMOTEDSMAgentNode:** nodename
- **SQLAUTHENTICATION:** [INTEGRATED|SQLUSERID]
- **SQLBUFFERS:** numsqlbuffers (0..999)
- **SQLBUFFERSIZE:** sqlbuffersize (64..4096)
- **SQLSERVER:** [sqlprotocol:]sqlservername
- **STRIPES:** numstripes (1..64)
- **TIMEFORMAT:** timeformatnum
  - 1: HH:MM:SS
  - 2: HH,MM,SS
  - 3: HH.MM.SS
  - 4: HH:MM:SSA/P
- **SOFTWAREVERSION:** [softwareversion]

**Note:** If a configuration file is not specified, the default values are used. Default configurable parameters can also be set in the GUI menu bar item.
Set syntax

Use the set command syntax diagrams as a reference to view available options and truncation requirements.

```
------ TDPSQLC Set Backup DESTINATION ---------
| TSM                        | LOCAL                      |
| BACKUPDESTINATION=TSM      | LOCAL                      |
| BACKUPMETHOD=VSS           | BOTH                       |
| BUFFers=numbuffers         | LEGACY                     |
| BUFFERSIZE=buffersizeinkb  |                           |
| DATEformat=dateformatnum   |                           |
| DIFFESTimate=numpercent    |                           |
| FROMSQLserver=fromsqlserver|                           |
| LANGUAGE=language          |                           |
| LOCALDSMAGENTNODE=nodename |                           |
| LOGFile=logfilename        |                           |
| LOGPrune=numdays           |                           |
| NUMBERformat=numberformatnum|                           |
| MOUNTWaitfordata=Yes       |                           |
| REMOTEDSMAGENTNODE=nodename|                           |
| SQLAUTHentication=INTegrated|                          |
| SQLBUFFers=numsqlbuffers   |                           |
| SQLBUFFERSIZE=sqlbuffersizeinkb|                      |
| SQLCOMPression=Yes         |                           |
| SQLSERVER=sqlprotocol:sqlservername|                  |
| STRIPES=numstripes         |                           |
| TIMEformat=timeformatnum   |                           |
```

Set Optional Parameters:

```
--------- CONFIGfile -----------
| /CONFIGfile=tdpsql.cfg         |
| /CONFIGfile=configfilename     |
```

Set positional parameters

Positional parameters immediately follow the set command and precede the optional parameters.

To set default values in the Data Protection for SQL configuration file, specify one of the following when issuing a set command.

**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.

BACKUPMETH0d=Legacy | VSS
Use the BACKUPMETHOD positional parameter to specify the method for your backup. You can specify:

LEGACY
Data Protection for SQL uses the legacy API to perform the backup. This is the default.

VSS
Data Protection for SQL uses VSS to perform the backup.

BUFFers=numbuffers
The buffers parameter specifies the number of data buffers used for each data stripe to transfer data between Data Protection for SQL and the Tivoli Storage Manager API. You can improve throughput by increasing the number of buffers, but you will also increase storage use. Each buffer is the size specified by the /buffersize parameter. The numbuffers variable refers to the number of data buffers to use. The number can range from 2 to 8. The initial value is 3.

BUFFERSIze=buffersizeinkb
The buffersize parameter specifies the size of each Data Protection for SQL buffer specified by the buffers parameter. The buffersizeinkb variable refers to the size of data buffers in kilobytes. The number can range from 64 to 8192. The default is initially 1024.

DATEformat=dateformatnum
The /dateformat parameter selects the format you want to use to display dates.

The dateformatnum variable can range from 1 to 7. The initial value is 1. The number values specify the following formats:

1  MM/DD/YYYY.
2  DD-MM-YYYY.
3  YYYY-MM-DD.
4  DD.MM.YYYY.
5  YYYY.MM.DD.
6  YYYY/MM/DD.
7  DD/MM/YYYY.

Changes to the value of the dateformat parameter can result in an undesired pruning of the Data Protection for SQL log file (tdpsql.log by default). You can avoid losing existing log file data by performing one of the following:

• After changing the value of the dateformat parameter, make a copy of the existing log file before running Data Protection for SQL.
• Specify a new log file with the /logfile parameter.

DIFFESTimate=numpercent
For differential database backups using the Data Protection for SQL backup command, diffestimate specifies the estimated fraction of an entire
SQL database that has changed since its last full database backup. This estimate is needed because SQL Server does not provide a way to determine the size of a differential backup, and because the Tivoli Storage Manager server requires an accurate size estimate to efficiently allocate space and place objects. The Tivoli Storage Manager server uses this value to determine if there is enough space in the primary storage pool to contain the SQL database backup. Because a separate backup object is created for each specified SQL database, this estimate applies to each specified SQL database individually. The \textit{numpercent} variable can range from 1 to 99. Because a differential backup backs up database pages, this number is the percent of database pages changed since the last full database backup. The initial value is 20.

\textbf{Considerations:}

\begin{itemize}
\item If the estimate is significantly smaller than the actual quantity of changes, the Tivoli Storage Manager server may be forced to abnormally end the backup because the backup size is larger than the space the Tivoli Storage Manager server allocated for it.
\item If the estimate is significantly larger than the actual quantity of changes, the server may be forced to place the backup object higher in the storage pool hierarchy than otherwise necessary, possibly on removable media.
\end{itemize}

\textbf{FROMSQLSERVer=sqlservername}

The \textit{fromsqlserver} parameter specifies the SQL server that backup objects were backed up from. This parameter is necessary only when the name of the SQL server to restore to, as determined by the \textit{sqlserver} parameter, is different from the name of the SQL server that the backup objects were created from. Use \textit{fromsqlserver} for \texttt{query TSM} and \texttt{inactivate} commands, but use \textit{sqlserver} for \texttt{query SQL} commands. The default value is the \textit{sqlserver} value or the value set in the Data Protection for SQL configuration file.

\textbf{LANGUAGE=language}

Specify the three-character code of the language you want to use to display messages:

\begin{itemize}
\item CHS Simplified Chinese
\item CHT Traditional Chinese
\item DEU Standard German
\item ENU American English (This is the default.)
\item ESP Standard Spanish
\item FRA Standard French
\item ITA Standard Italian
\item JPN Japanese
\item KOR Korean
\item PTB Brazilian Portuguese
\end{itemize}

\textbf{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.

\textbf{LOGFile=logfilename}

The \textit{logfile} parameter specifies the name of the activity log that is
generated by Data Protection for SQL. The activity log records significant events such as completed commands and error messages. This log is distinct from the SQL Server error log. The logfilename variable identifies the name to be used for the activity log generated by Data Protection for SQL.

Considerations:

- If the specified file does not exist, it is created. If it does exist, new log entries are appended to the file.
- The file name can include a fully-qualified path; however, if you specify no path, the file is written to the directory where Data Protection for SQL is installed.
- You cannot turn Data Protection for SQL activity logging off. If you do not specify /logfile, log records are written to the default log file. The default log file is tdsqsql.log.

LOGPrune=numdays | No

The logprune parameter prunes the Data Protection for SQL activity log and specifies how many days of entries to save. By default, log pruning is enabled and performed once each day Data Protection for SQL is executed; however, this option allows you to disable log pruning. The numdays variable represents the number of days to save log entries.

Considerations:

- If you specify numdays, it can range from 0 to 9999. The initial value is 60. A value of 0 deletes all entries in the Data Protection for SQL activity log file except for the current command entries.
- If you specify no, the log file is not pruned.

NUMBERformat=numberformatnum

The numberformat parameter specifies the format of the numbers displayed by Data Protection for SQL. The numberformatnum variable can range from 1 to 6. The initial value is 1. The number values specify the following formats:

- 1 1,000.00
- 2 1,000.00
- 3 1 000.00
- 4 1 000.00
- 5 1,000,00
- 6 1'000,00

MOUNTWaitfordata=Yes | No

If the Tivoli Storage Manager server is configured to store backup data on removable media such as tapes or optical media, it is possible that the Tivoli Storage Manager server may indicate to Data Protection for SQL that it is waiting for a required storage volume to be mounted. If that occurs, this option allows you to specify whether Data Protection for SQL backup and restore commands wait for the media mount or stop the current operation. The initial value is yes.

Considerations:
• If you use data striping, Data Protection for SQL cannot complete waiting until the initial media for all stripes are available, although Data Protection for SQL starts to use each stripe as its media becomes available. Because of the way SQL Server distributes data among stripes, if any stripe does not have its media available, each of the stripes may eventually be either waiting for its own or another stripe’s media to become available. In this case, it may become necessary to terminate the Data Protection for SQL command from a prolonged wait. This can be done only by terminating the Data Protection for SQL program (close the command prompt window or enter control-c).

• If the management class for meta objects also requires removable media, Data Protection for SQL waits for that volume. During backup operations, the wait occurs after all of the data is transferred because meta objects are not created until after the data objects are complete. During restore operations, if the metadata is required, the wait occurs before any of the data is transferred.

• If you specify no and any removable media are required, Data Protection for SQL terminates the command with an error message. This is also true if the management class for meta objects requires removable media, but, during backups, the command termination does not occur until after all of the data is transferred.

**REMOVEDSMAGENTNODE=** nodename
Specify the node name of the machine that moves the VSS data to Tivoli Storage Manager server storage during off-loaded backups.

**SQLAUTHENTICATION=** INTegrated | SQLuserid
This parameter specifies the authorization mode used when logging on to the SQL server. The integrated value specifies Windows NT or Windows 2000 authentication. The user id you use to log on to Windows is the same id you will use to log on to the SQL server. This is the default value. Use the sqluserid value to specify SQL Server user id authorization. The user id specified by the sqluserid parameter is the id you will use to log on to the SQL server. That user id must have the SQL Server SYSADMIN fixed server role.

**SQLBUFFERS=** numsqlbuffers
The sqlbuffers parameter specifies the total number of data buffers SQL Server uses to transfer data between SQL Server and Data Protection for SQL. The numsqlbuffers variable refers to the number of data buffers to use. The number can range from 0 to 999. The default value is 0. When sqlbuffers is set to 0, SQL determines how many buffers should be used. The numsqlbuffers variable is limited by storage restrictions. If you specify a value other than 0, the number you specify must be equal to or greater than the number of data stripes that you use. Up to 64 stripes may be used. If you specify a value other than 0 and receive errors during a backup, specify a value of 0 and try the backup again.

**SQLBUFFERSIZE=** sqlbuffersizeinkb
The sqlbuffersize parameter specifies the size of each buffer (specified by the sqlbuffers parameter) SQL Server uses to transfer
data to Data Protection for SQL. The sqlbuffersizeinkb variable refers to the size of data buffers in kilobytes. The number can range from 64 to 4096. The default is initially 1024.

/SQLOMPression=Yes | No

The /sqlcompression parameter specifies whether SQL compression is applied. If you do not specify sqlcompression, the default value No is used.

Sqlcompression is only available with Legacy backups on SQL Server 2008 (or later). For SQL Server 2008, backup compression is only supported on Enterprise Edition. SQL Server 2008 R2, backup compression is supported on Standard, Enterprise, and Datacenter editions. Starting with SQL Server 2008, any edition can restore a compressed backup.

SQL Server 2008 backup compression is generally faster and more effective than using it together with Tivoli Storage Manager compression. Tivoli Storage Manager compression is also effective at reducing the backup window needed to protect SQL Server and is a good choice for SQL Server 2005 (or earlier).

SQLSERVer=sqlprotocol:sqlservername

The sqlserver parameter specifies the SQL server that Data Protection for SQL logs on to. This is the SQL server that backup objects are restored to. However, if the backup objects were created from a different SQL server name, you must use the fromsqlserver parameter. Use sqlserver for the query SQL command, but use fromsqlserver for the query TSM and inactivate commands. The sqlprotocol variable specifies the communication protocol to use. You can specify one of the following protocols:

• lpc: Use Shared Memory protocol.
• np: Use Named Pipes protocol.
• tcp: Use Transmission Control protocol.
• via: Use Virtual Interface Architecture protocol.

If no protocol is specified, Data Protection for SQL logs on to the SQL server according to the first protocol that becomes available.

STRIPes=numstripes

The stripes parameter specifies the number of data stripes to use in a backup or restore operation. The numstripes variable can range from 1 to 64. The default is initially 1. Note that stripes are not available for VSS operations.

TIMEformat=timeformatnum

The timeformat parameter specifies the format of the times displayed by Data Protection for SQL. The timeformatnum variable can range from 1 to 4. The initial value is 1. The number values specify the following formats:

<table>
<thead>
<tr>
<th>Value</th>
<th>Format</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>23:00:00</td>
</tr>
<tr>
<td>2</td>
<td>23:00:00</td>
</tr>
<tr>
<td>3</td>
<td>23:00:00</td>
</tr>
<tr>
<td>4</td>
<td>11:00:00 A/P</td>
</tr>
</tbody>
</table>
Changes to the value of the `timeformat` parameter can result in an undesired pruning of the Data Protection for SQL log file (tdpsql.log by default). You can avoid losing existing log file data by performing one of the following:

- After changing the value of the `timeformat` parameter, make a copy of the existing log file before running Data Protection for SQL.
- Specify a new log file with the `/logfile` parameter.

**Set optional parameters**

Optional parameters follow the `set` command and positional parameters.

`/CONFIGfile=configfilename`

The `/configfile` parameter specifies the name of the Data Protection for SQL configuration file, which contains the values for the Data Protection for SQL configurable options.

**Considerations:**

- `configfilename` can include a fully qualified path. If `configfilename` does not include a path, it uses the directory where Data Protection for SQL is installed.
- If `configfilename` includes spaces, place it in double quotes.
- If you do not specify `/configfile`, the default value is `tdpsql.cfg`.
- If you specify `/configfile` but not `configfilename`, the default value `tdpsql.cfg` is used.

**Set output examples**

These output examples provide a sample of the text, messages, and process status that displays when using the `set` command.

The following specifies the `mutalisk` server as the default SQL server in the configuration file.

**Command:**

```
tdpsqlc set sqlserver=mutalisk
```

**Output:**

```
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.
AC05054I The configuration option was set successfully.
```
Changetsmpassword command

Use the changetsmpassword command to change the Tivoli Storage Manager password used by Data Protection for SQL.

Changetsmpassword

Use the changetsmpassword command syntax diagrams as a reference to view available options and truncation requirements.

```
TDPSQLC—CHANGETSMPassword
  oldpassword—newpassword—verifypassword
```

Optional Parameters:

```
/CONFIGfile=tdpsql.cfg
  =configfilename

/LOGFile=tdpsql.log [or cfg value]
  =logfilename

/LOGPrune=60 [or cfg value]
  =numdays
  =No

/TSMNODE=[dsm.opt value]
  =tsmnodename

/TSMOPTFile=dsm.opt
  =dsmoptfilename
```

Changetsmpassword positional parameters

Positional parameters immediately follow the changetsmpassword command and precede the optional parameters.

You are prompted for the following parameters if you do not specify them with the changetsmpassword command:

- **oldpassword**
  - This specifies the old (current) Tivoli Storage Manager password you want to change.

- **newpassword**
  - This specifies the new Tivoli Storage Manager password.

A Tivoli Storage Manager password is not case sensitive and may be composed of 1 to 63 of the following characters:
- the letters A through Z
- the digits 0 through 9
- the special characters plus (+), period (.), underscore (_), hyphen (—), and ampersand (&)
verifyPassword
This specifies the new Tivoli Storage Manager password again as a verification that newPassword is correct.

Changetsmpassword optional parameters
Optional parameters follow the changetsmpassword command and positional parameters.

/CONFIGfile=configfilename
The /configfile parameter specifies the name of the Data Protection for SQL configuration file, which contains the values for the Data Protection for SQL configurable options. See “Set positional parameters” on page 178 for details on the file's contents.

Considerations:
- configfilename can include a fully qualified path. If configfilename does not include a path, it uses the directory where Data Protection for SQL is installed.
- If configfilename includes spaces, place it in double quotes.
- If you do not specify /configfile, the default value is tdsqsql.cfg.
- If you specify /configfile but not configfilename, the default value tdsqsql.cfg is used.

/LOGFile=logfilename
The /logfile parameter specifies the name of the activity log that is generated by Data Protection for SQL. This activity log records significant events such as completed commands and error messages. The Data Protection for SQL activity log is distinct from the SQL Server error log. The logfilename variable identifies the name to be used for the activity log generated by Data Protection for SQL.

Considerations:
- If the specified file does not exist, it is created. If it does exist, new log entries are appended to the file.
- The file name can include a fully-qualified path; however, if you specify no path, the file is written to the directory where Data Protection for SQL is installed.
- You cannot turn Data Protection for SQL activity logging off. If you do not specify /logfile, log records are written to the default log file. The default log file is tdsqsql.log.
- When using multiple simultaneous instances of Data Protection for SQL to perform operations, use the /logfile parameter to specify a different log file for each instance used. This directs logging for each instance to a different log file and prevents interspersed log file records. Failure to specify a different log file for each instance can result in unreadable log files.

/LOGPrune=numdays | No
The /logprune parameter prunes the Data Protection for SQL activity log and specifies how many days of entries are saved. By default, log pruning is enabled and performed once each day Data Protection for SQL is executed; however, this option allows you to disable log pruning or explicitly request a prune of the log for one command run even if the log file has already been pruned for the day. The numdays variable represents the number of days to save log entries. By default, 60 days of log entries are saved in the prune process.
Considerations:

- If you specify `numdays`, it can range from 0 to 9999. A value of 0 deletes all entries in the Data Protection for SQL activity log file except for the current command entries.
- If you specify `no`, the log file is not pruned during this command.
- If you do not specify `/logprune`, the default value is that specified by the logprune configurable option in the Data Protection for SQL configuration file. This is initially 60.
- If you specify `/logprune`, its value is used instead of the value stored in the Data Protection for SQL configuration file. Specifying this parameter does not change the value in the configuration file.
- You can specify `/logprune` without specifying `numdays` or `no`; in this case, the default 60 is used.
- Changes to the value of the `timeformat` or `dateformat` parameter can result in an undesired pruning of the `&agentname;` log file. If you are running a command that may prune the log file and the value of the `timeformat` or `dateformat` parameter has changed, perform one of the following to prevent undesired pruning of the log file:
  - Make a copy of the existing log file.
  - Specify a new log file with the `/logfile` parameter or `logfile` setting.

/TSMNODE=tsmnodename

The `/tsmnodename` parameter specifies the Tivoli Storage Manager node name that Data Protection for SQL uses to log on to the Tivoli Storage Manager server. This identifies which Tivoli Storage Manager client is requesting services. You can also store the node name in the options file. The command line parameter overrides the value in the options file.

Considerations:

- You cannot use the `/tsmnodename` parameter if `PASSWORDACCESS GENERATE` is specified in the Tivoli Storage Manager options file. You must specify the nodename in the options file. Otherwise, you can change `PASSWORDACCESS` to `PROMPT` to utilize the `/tsmnodename` parameter. For details about the Tivoli Storage Manager options file, see the reference manual `IBM Tivoli Storage Manager for Windows Backup-Archive Client Installation and User’s Guide`.
- If you do not specify `/tsmnodename`, the default value is that specified by the nodename option in the Tivoli Storage Manager options file. Specifying this parameter does not change the value in the options file.

/TSMOPTFile=dsmoptfilename

The `/tsmoptfile` parameter specifies the Tivoli Storage Manager options file to use. This is similar to selecting a Tivoli Storage Manager server from the server list in the GUI. The Tivoli Storage Manager options file contains the configuration values for the Tivoli Storage Manager API. For details about the Tivoli Storage Manager options file, see the reference manual `IBM Tivoli Storage Manager for Windows Backup-Archive Client Installation and User’s Guide`.

Considerations:

- The `tsmoptfilename` variable can include a fully qualified path. If you do not include a path, the directory where Data Protection for SQL is installed is used.
- If `tsmoptfilename` includes spaces, you must enclose it in double quotes.
- If you do not specify `/tsmoptfile`, the default value is `dsm.opt`. 

Chapter 5. Command line interface  187
If you specify /tsmoptfile but not tsmoptfilename, the default is also dsm.opt.

Changetspassword output examples

This output example provides a sample of the text, messages, and process status that displays when using the changetspassword command.

The following displays changing the Tivoli Storage Manager password.

Command:
tdpsqlc changetsp sqlv2old sqlv2new sqlv2new

Output:

IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 5, Level 4.0
(C) Copyright IBM Corporation 1997, 2010. All rights reserved.

AC002601 Password successfully changed.
Chapter 6. Using the Tivoli Storage Manager scheduler

This section provides an example of how to use the Tivoli Storage Manager scheduler with Data Protection for SQL to automate online backups of SQL Server databases. This example illustrates the use of the Tivoli Storage Manager scheduler and creating a full backup of your SQL databases.

Note: To ensure that this example works, you should obtain and install the latest Tivoli Storage Manager Backup-Archive Client.

Once Data Protection for SQL has been registered to a Tivoli Storage Manager server and installed on the SQL Server, the procedure consists of the following steps:

1. **On the Tivoli Storage Manager server:**
   a. Define a schedule to execute a Windows command file. This schedule must be defined in the policy domain to which Data Protection for SQL is registered.
   b. Associate the Data Protection for SQL node to the defined schedule.

2. **On the machine where SQL Server and Data Protection for SQL are installed:**
   a. Install the Tivoli Storage Manager scheduler client as a Windows service for Data Protection for SQL. If a scheduler already exists for the regular Tivoli Storage Manager backup client, install another one for Data Protection for SQL.
   b. Define a command file that contains the Data Protection for SQL commands to do the desired backup.

   Note: Refer to Windows documentation for details on creating a Windows command file.
   c. If you are running in a cluster server environment, install the Tivoli Storage Manager scheduler client as a Windows service on both cluster nodes.
   d. If you are running in a cluster server environment, create a new cluster resource that represents the Tivoli Storage Manager scheduler. Verify that the cluster resource is started.
   e. Start the scheduler installed in step 2a (this is step 2.1 in some HTML browsers).

**Example scheduler procedure**

This example assumes the following environment:

- Data Protection for SQL 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 backup of all of the SQL databases.
  - The backups begin between 9:00 and 9:15 pm.

This method is flexible because you can define a command file with any set of commands you choose. This allows you to use the same Tivoli Storage Manager...
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:\sqlfull.cmd`. A sample command file (`sqlfull.smp`) is provided in the directory where Data Protection for SQL is installed. This sample file contains commands necessary to perform a scheduled full backup of all SQL Server databases 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 a SQL Server running in a cluster environment:
   - Your command file must reside on the SQL 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:\sqlfull.cmd` could be `x:\sqlfull.cmd` where `x` is the SQL 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 SQL 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="SQL Daily Full Backup" action=command objects="c:\sqlfull.cmd" priority=2
   starttime= 21:00 duration=15 duru=minutes period=1 perunits=day
dayofweek=any
   ```

   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 SQL 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:\sqlfull.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 SQL Server

This section of the procedure assumes the following environment:

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

The options file that is defined for Data Protection for SQL 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
- make sure the communication options in the dsm.opt file points to the correct Tivoli Storage Manager server.
- make sure the Tivoli Storage Manager server is running.

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 \"Program Files\Tivoli\TSM\baclient\"

   If the path you want to use has a space in it, you can place quotation marks around the section of the pathname that contains a space (\"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 path.

   An example of the short form of the path is as follows:
   
   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 SQL. 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 inst /name:Data Protection for SQL Scheduler
   /node:mynode /password:mypassword /autostart=yes
   /clientdir:\"Program Files\Tivoli\TSM\baclient\"
   /optfile:\"Program Files\Tivoli\TSM\TDPSql\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 SQL Server running in a cluster environment:

   a. Change the `autostart` option to no. For example:
      
      /autostart:no

Chapter 6. Using the Tivoli Storage Manager scheduler 191
b. Move the SQL 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 SQL 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 1, Level 0.0
(C) Copyright IBM Corporation, 1990, 2009, All Rights Reserved.
Last Updated March 29 2010
TSM Api Version 6.1.0

Command: Install TSM Client Service
Machine: TDPSQ1(Local Machine)

Installing TSM Client Service:

Machine : MYNODE
Service Name : Data Protection for SQL 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 SQL 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\TDPSq1\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 SQL Scheduler"
```

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

**Note:** If you are setting up the scheduler service for a SQL 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 `dsmc util` 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 SQL Scheduler"
   ```

   This output is displayed:

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

   Note that because `/autostart`: `yes` is specified, the Tivoli Storage Manager scheduler automatically starts each time the Windows system is rebooted.

   **Note:** IMPORTANT!
   - 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 SQL Server Cluster Group and create a new Resource to represent the Data Protection for SQL scheduler (File–>New–>Resource). Make sure the following parameters are specified:

   **Resource Type**
   Specify `Generic Service`.

   **Group** Specify the SQL Virtual Server.

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

   **Resource Dependencies**
   Make sure the SQL 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.

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 SQL node name is listed. For example:

   ```
   SOFTWARE\IBM\ADSM\CurrentVersion\BackupClient\NODES\<nodename>\ServerName
   ```

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

   ```
   SOFTWARE\IBM\ADSM\CurrentVersion\BackupClient\NODES\MYNODE\ServerName
   ```

9. In the Windows command prompt window, change to the Data Protection for SQL installation directory:

   ```
   cd /d d:"Program Files"\Tivoli\TSM\TDPSql
   ```
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.
   
   tdpsqlc 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 SQL scheduler service on the primary node has started.

13. Enter the following command to start the client scheduler on the machine where the Backup-Archive Client is installed:
   
   dsmc sched

   An example of the output is displayed below:

   Tivoli Storage Manager
   Command Line Backup/Archive Client Interface - Version 5, Release 51, Level 0.0
   (C) Copyright IBM Corporation 1990, 2007 All Rights Reserved.

   Querying server for next scheduled event.
   Node Name: MYNODE
   Session established with server TYPP_CLINT: Win 2003

   Server Version 5, Release 4, Level 0.0


   Next operation scheduled:
   -----------------------------------------------
   Schedule Name: DATA PROTECTION FOR SQL SCHEDULER
   Action: Command
   Objects: C:\sqlfull.cmd
   Options:
   -----------------------------------------------
   Schedule will be refreshed in 1 hour.

   Time remaining until execution: 00:59:58

   Your system is now ready to run automatic daily full backups of the SQL databases.

---

**Scheduler guidelines**

The guidelines assist when planning scheduled operations.

Be aware of the following guidelines when defining a Tivoli Storage Manager schedule:

- If you want to use the Tivoli Storage Manager server-prompted scheduling mode, you must ensure that the Data Protection for SQL 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 SQL 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 SQL uses the client polling schedule mode.

- If any changes that affect the scheduler are made to the Data Protection for SQL 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 SQL Scheduler"
  net start "Data Protection for SQL Scheduler"

*Note:* 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 (dsm sched.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\TDPSql\dmsched.log

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

- Data Protection for SQL creates its own log file with statistics about the backed up database objects when the `/logfile` parameter is specified during the `tdpsqlc` command. In the sample file (sqlfull.smp), the log file is sqlsch.log. This file is different from the Tivoli Storage Manager scheduler log file and must also be different from the file to which the `tdpsqlc` command output is redirected. In the example above, this file is sqlfull.log.

*Note:* Output from scheduled commands are sent to the scheduler log file (dmsched.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:

- The preferred method of password management for scheduler operations is to specify `passwordaccess generate` in the dsm.opt file. If `passwordaccess generate` is not specified in the dsm.opt file, then the Tivoli Storage Manager password needs to be specified on the `tdpsqlc` command. To specify the password, use the `/tsmpassword` parameter in the command file being run by the scheduler (sqlfull.cmd). You can also specify the password on the Data Protection for SQL command line. For example:

  `tdpsqlc query tsm /tsmnode=mynode /tsmpassword=newpassword`
Appendix A. Frequently asked questions

This section contains information on frequently asked questions regarding Data Protection for SQL.

Can I restore an individual table from a SQL Server backup?
Yes. Place the tables that require individual restore granularity into their own file group. Then, use Data Protection for SQL to restore a single file group from a full backup.

Can I restore VSS Backups to an alternate SQL Server?
No. This feature is not supported by Microsoft.

Can I restore VSS Backups to alternate locations?
Yes, this feature is supported by Data Protection for SQL.
- On the command line interface, use the /relocatedir parameter. See “Restore optional parameters” on page 139 for more information about this parameter.
- In the GUI, use the Relocate option in the Restore Databases window. See “Restore options” on page 77 for more information about this option.

Can I restore VSS Backups to alternate database names?
Yes, this feature is supported by Data Protection for SQL.
- On the command line interface, use the /into parameter. See “Restore optional parameters” on page 139 for more information about this parameter.
- In the GUI, use the Restore Into option in the Restore Databases window. See “Restore options” on page 77 for more information about this option.

How can I restore a SQL database backup to an alternate SQL Server machine or database?
See Appendix G, “Restoring to an alternate machine,” on page 219 for information about performing this procedure.

Can I use Data Protection for SQL to back up SQL databases, logs, and then also shrink the transaction log file?
Modify the command file (that is used for scheduled backups) with an entry that calls a T-SQL command file that shrinks the transaction log file. For example, in the following command file that is used for scheduled backups:

tdpsqlc backup * full
tdpsqlc backup * log
osql -E -i shrinkjob.sql

The file shrinkjob.sql is a T-SQL command file that will shrink the transaction log file. See the following sections for more information:
- Chapter 6, “Using the Tivoli Storage Manager scheduler,” on page 189
- “Backup command” on page 86

Should I create a separate node name in order to create an archive backup of a SQL database?
First, use the same node name as the primary SQL node but add an extension for the archive node. For example:
Second, use a separate Data Protection for SQL options file (dsmarchive.opt) that contains the archive node with the desired archive settings. See the following sections for more information about nodes and options:

- “Data Protection for SQL node name: Recommended settings” on page 49
- “Specifying Data Protection for SQL options” on page 52

How do I back up a SQL Server 2005 or later database with database mirroring?
See the Microsoft TechNet article “Database Mirroring in SQL Server 2005” at the following URL: http://www.microsoft.com/technet/prodtechnol/sql/2005/dbmirror.mspx

Can I perform VSS operations in a clustered SQL Server environment?
Yes, Data Protection for SQL supports VSS operations in a clustered SQL Server environment. See “Using VSS operations in a cluster” on page 22 for detailed information.

Why can I not perform VSS operations?
The IBM Tivoli Storage Manager for Copy Services Microsoft SQL VSS Integration Module must be installed. See “Software and operating system requirements” on page 31 for detailed information.

Why can I not perform VSS Instant Restore even though I have SAN Volume Controller or a DS storage subsystem installed?
If your Tivoli Storage Manager Client version is earlier than 6.1.0, you must install the IBM Tivoli Storage Manager for Copy Services Hardware Devices Snapshot Integration Module. See “Software and operating system requirements” on page 31 for detailed information.

How can I use VSS and Legacy backups together in a common backup strategy?
See “Using VSS and Legacy Backups together” on page 20 and “Back up to Tivoli Storage Manager storage versus back up to local shadow volumes” on page 42 for detailed information.

Can I use Legacy backups and VSS Backups together?
Yes, you can apply Legacy differential and Legacy log backups after a full VSS Backup has been restored. In order to do this, you must leave the database in a recovering state by specifying /recovery=no on the command-line interface or by making sure that the Recovery option in the GUI Restore Databases or Restore Groups/Files is not selected when restoring the VSS Backup. Note that VSS only supports full backups. Log, differential, individual file groups, individual files, and set backups are not supported by VSS. See “Using VSS and Legacy Backups together” on page 20 for more information.

When restoring very large SQL databases, how can I prevent the restore operation from failing due to a time out error?
SQL Server rebuilds and formats new physical files into which the backup data is restored. Because this process can continue for more than an hour for large databases, the Tivoli Storage Manager session might timeout and cause the restore process to fail. To prevent such a failure, set the value of the Tivoli Storage Manager COMMTIMEOUT option to 3600 (or higher). Set the value to 10000 (or higher) for databases larger than 100 GB. For a LANFREE restore operation, increase the value of both the COMMTIMEOUT and IDLETIMEOUT options for the Storage Agent.
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, DS6000, DS8000, or XIV Gen 2 storage subsystem is required to perform VSS Instant Restores. See “VSS Instant Restore” on page 26 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 SQL” on page 19 and “Back up to Tivoli Storage Manager storage versus back up to local shadow volumes” on page 42 for more information.

Why do I receive a TCP/IP timeout failure when I have Windows internal VSS tracing turned on?
Data Protection for SQL VSS operations might 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.

What should my Data Protection for SQL performance settings be?
The default value of the buffers parameter (3) and the buffsize parameter (1024) have demonstrated the best performance in testing. However, environment factors such as network speed, physical database layout, machine resources, and SQL Server resources all affect Data Protection for SQL performance and should be considered when determining your settings. Note that the buffers and buffsize parameters apply to Legacy backups only. See the following sections for more information:

- “Performance” on page 29
- “Specifying Data Protection for SQL options” on page 52
- “/buffers and /buffsize parameters” (with the backup command) on “Backup optional parameters” on page 92
- “/buffers and /buffsize parameters” (with the restore command) on “Restore optional parameters” on page 139
- “/buffers and /buffsize parameter” (with the set command) on “Set optional parameters” on page 184

How do I schedule Data Protection for SQL backups?
You can schedule Data Protection for SQL backups by using the Tivoli Storage Manager Backup-Archive client scheduler. See the following sections for more information:

- Chapter 6, “Using the Tivoli Storage Manager scheduler,” on page 189
- “Backup types” on page 14
- “Backup strategies” on page 16

How do I set up Data Protection for SQL to run in a cluster?
The following sections contain information about using Data Protection for SQL in a cluster environment:

- “Using Data Protection for SQL in a Microsoft Cluster Server environment” on page 23
How do I know if my backup ran successfully?
A message displays that states the backup completed successfully. In addition, processing information is available in the following files:

- Data Protection for SQL log file (default: tdpsql.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 SQL logs information on 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: dsierror.log)

Should I use the same nodename as used by my Backup-Archive client?

**Legacy backups:** It is recommended that you 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 SQL options” on page 52](#) for more information.

How do I set up LANFree to back up Data Protection for SQL over my SAN?
See the LAN Free section in [“Performance” on page 29](#).
Appendix B. Transitioning SQL 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 at the same time. 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.

Tivoli Storage FlashCopy Manager works when connected to the local Tivoli Storage FlashCopy Manager server or a Tivoli Storage Manager server. The Tivoli Storage Manager server can be located anywhere on your network. The Tivoli Storage FlashCopy Manager Snap-in includes two configuration wizards. These enable you to do a local configuration and a Tivoli Storage Manager configuration. You can move from one type of server to another by running the corresponding configuration wizard at any time.

Using the Tivoli Storage Manager server wizard

You can use the Tivoli Storage Manager server wizard to transitioning SQL Server backups from Tivoli Storage FlashCopy Manager to Tivoli Storage Manager. The wizard leads you through all the steps necessary to perform the configuration. You do not then need to perform the manual steps listed below.

Implement 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 SQL to retrieve this information.

2. Register your Data Protection for SQL 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 SQL server is installed. For example:
   
   ```
   register node BAnodename BApassword
   ```

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
   ```
**Implement these tasks on the workstation running the SQL Server**

1. In the directory where the Data Protection for SQL 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 SQL command line prompt from the Tivoli Storage FlashCopy Manager Snapin: In the Tivoli Storage FlashCopy Manager Snapin Tree view, an SQL server node is displayed for each SQL server instance on the computer.
   a. Select an SQL server instance in the tree view. The integrated command line and an Actions pane is displayed.
   b. Launch the Data Protection for SQL 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 SQL configuration file. For example:
   `copy tdpsql.cfg tdpsql_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 Word Pad.

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 SQL 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:

      tdsqsqlc update policy mypolicy /daysretain=30
      /tsmoptfile=dsm_local.opt
      /configfile=tdpsqsql_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 SQL 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:

      tdsqsqlc query tsm * /all
      /tsmoptfile=dsm_local.opt
      /configfile=tdpsqsql_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 SQL delete backup command, or the Delete Backup (right mouse-click menu option) in the GUI Restore window.
11. To access the Tivoli Storage FlashCopy Manager stand-alone environment:
   a. Start the SQL Client – Command Line prompt.
   b. Start Tivoli Storage FlashCopy Manager stand-alone commands by appending the /tsmoptfile option, for example:
      
      tdpsqlc query tsm * /all
      /tsmoptfile=dsm_local.opt
      /configfile=tdpsql_local.cfg
   
   c. Start the GUI (from the Command Line prompt) by issuing the GUI invocation command, for example:
      
      tdpsql /tsmoptfile=dsm_local.opt
      /configfile=tdpsql_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 C. Installing Data Protection for SQL silently

Administrators can install Data Protection for SQL using silent installation. A silent installation runs on its own without any intervention so that administrators are freed from the task of monitoring the installation and providing input to dialog boxes. This method is especially useful when Data Protection for SQL must be installed on a number of different computers with identical hardware. For example, a company may have 25 SQL Servers spread out across 25 different sites. To ensure a consistent configuration and to avoid having 25 different people enter Data Protection for SQL parameters, an administrator may choose to produce an unattended install and make it available to the 25 sites by cutting and sending out 25 CDs or by placing the unattended installation package on a file server.

You can perform a silent installation 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>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>/i</td>
<td>Specifies the program is to install the product.</td>
</tr>
<tr>
<td>/lv</td>
<td>Specifies verbose logging.</td>
</tr>
<tr>
<td>/qn</td>
<td>Runs the installation without running the external user interface sequence.</td>
</tr>
<tr>
<td>/s</td>
<td>Specifies silent mode.</td>
</tr>
<tr>
<td>/v</td>
<td>Specifies the Setup Program to pass the parameter string to the call it makes to the MSI executable (<code>msiexec.exe</code>). Note the following syntax requirements when invoking the /v option:</td>
</tr>
<tr>
<td></td>
<td>• A backslash () must be placed in front of any quotation marks (&quot; &quot; ) that reside within existing quotation marks.</td>
</tr>
<tr>
<td></td>
<td>• Do not include a space between the /v command line option and its arguments.</td>
</tr>
<tr>
<td></td>
<td>• Multiple parameters entered with the /v command line option must be separated with a space.</td>
</tr>
<tr>
<td></td>
<td>• 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.</td>
</tr>
<tr>
<td>/x</td>
<td>Specifies the program is to uninstall the product.</td>
</tr>
<tr>
<td>addlocal</td>
<td>Specifies features to install.</td>
</tr>
<tr>
<td>allusers</td>
<td>Specifies which users can use the installation package.</td>
</tr>
<tr>
<td>installdir</td>
<td>Specifies the directory where Data Protection for SQL is to be installed.</td>
</tr>
</tbody>
</table>
Table 19. Silent installation options (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>reboot</td>
<td>Specifies whether or not to prompt the user to reboot the system after silent installation.</td>
</tr>
<tr>
<td></td>
<td>• Force Always prompts user to reboot after silent installation.</td>
</tr>
<tr>
<td></td>
<td>• Suppress Suppress prompt to reboot after silent installation.</td>
</tr>
<tr>
<td></td>
<td>• ReallySuppress Suppress all reboots and prompts to reboot after silent installation.</td>
</tr>
<tr>
<td>rebootyesno</td>
<td>Specifies whether or not to reboot the system after silent installation. Specify Yes to reboot the system after silent installation. Specify No not to reboot the system after silent installation.</td>
</tr>
<tr>
<td>transforms</td>
<td>Specifies language to install.</td>
</tr>
</tbody>
</table>

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

Table 20. Silent installation features (base client only)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client</td>
<td>Data Protection for SQL code</td>
</tr>
<tr>
<td>License_Paid</td>
<td>License file (Used when PAID versions of Data Protection for SQL are installed)</td>
</tr>
<tr>
<td>License_TryBuy</td>
<td>License file (Used when TryBuy versions of Data Protection for SQL are installed)</td>
</tr>
</tbody>
</table>

Table 21. Silent installation features (Language Packages only)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LanguageFiles</td>
<td>Language specific files</td>
</tr>
</tbody>
</table>

The following transforms are used in this procedure:

Table 22. Silent installation transforms

<table>
<thead>
<tr>
<th>Transform</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>1028.mst</td>
<td>CHT Chinese (Traditional)</td>
</tr>
<tr>
<td>1031.mst</td>
<td>DEU German</td>
</tr>
<tr>
<td>1033.mst</td>
<td>ENG English</td>
</tr>
<tr>
<td>1034.mst</td>
<td>ESP Spanish</td>
</tr>
<tr>
<td>1036.mst</td>
<td>FRA French</td>
</tr>
<tr>
<td>1040.mst</td>
<td>ITA Italian</td>
</tr>
<tr>
<td>1041.mst</td>
<td>JPN Japanese</td>
</tr>
<tr>
<td>1042.mst</td>
<td>KOR Korean</td>
</tr>
<tr>
<td>1046.mst</td>
<td>PTB Portuguese</td>
</tr>
<tr>
<td>2052.mst</td>
<td>CHS Chinese (Simplified)</td>
</tr>
</tbody>
</table>
Installing Data Protection for SQL with the setup program (setup.exe)

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

Note: This section shows an example of the Data Protection for SQL silent installation. You must substitute the appropriate feature when installing a language other than English. See Table 21 on page 206.

Run the following command to silently install Data Protection for SQL to the default installation directory:

```
setup /s /v/qn
```

This example silently installs Data Protection for SQL to a directory other than the default installation directory and includes custom features:

```
setup /s /v"INSTALLDIR="c:\program files\tivoli\tsm"
ADLOCAL="\Client,License_Paid"
TRANSFORMS=1033.mst /qn /i+v "c:\temp\log.txt"
```

Note:
1. You must place a backslash (\) before each quotation mark that is within an outer set of quotation marks (").
2. 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.
3. 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 desired parameters.

- c:\setup.bat — sample script to demonstrate unattended installation.

```
@echo off
rem ===================================
rem sample silent install script
rem
rem sample silent install script
rem setup /s /v"INSTALLDIR="X:\Desired Install Path" /qn"
rem
rem code could be added after the
rem installation completes to
rem customize the dsm.opt files
rem if desired
rem ===================================
```
Installing Data Protection for SQL with MSI (msiexec.exe)

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

Note: This section shows an example of the Data Protection for SQL silent installation. You must substitute the appropriate .msi package filename and Language Package feature when installing a language other than English. See Table 21 on page 206.

This example silently installs Data Protection for SQL to a directory other than the default installation directory and includes custom features:

```
msiexec /i
"IBM Tivoli Storage Manager for Databases - MS SQL.msi"
RebootYesNo="No" Reboot="Suppress" ALLUSERS=1
INSTALLDIR="c:\program files\tivoli\tsm"
ADDLOCAL="Client,License_Paid"
TRANSFORMS=1033.mst /qn /i+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.
- 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 an installation failure, please record symptoms and environment information for the failing install and contact customer support with that information. The following environmental information may be helpful:

- Operating system level
- Service pack
- Hardware description
- Install package (CD 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, you can check for the following:

- 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 by Tivoli.

Assuming that all looks correct, gather a detailed log of the failing install into a file called setup.log. To do this, run the setup program as follows:

```
setup /v"/i+v setup.log"
```
Creating the package on a CD or a file server

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

Creating a silent install package

First you will need to choose a location for the package. If you are burning a CD 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 you have a minimum of 14 MB of free space in the staging directory. The following commands can be executed to create the package.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>mkdir c:\tdpdpkg</td>
<td>– Create a staging directory for the silent install package</td>
</tr>
<tr>
<td>cd /d c:\tdpdpkg</td>
<td>– Go to the staging directory</td>
</tr>
<tr>
<td>xcopy g:*.* /s</td>
<td>– Copy the Data Protection for SQL CD distribution files to the staging directory</td>
</tr>
<tr>
<td>copy c:\setup.bat</td>
<td>– Replace the existing setup.bat with the one created in the previous step</td>
</tr>
</tbody>
</table>

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

Playing back the silent installation

Once the package is available on CD or from a shared directory it can be played back (run) on another machine. Allow enough time for the unattended setup to complete. No visual cues exist to inform you when the installation has finished, although this could be added in the batch file.

- From a silent install package on CD:
  If autostart is enabled, the silent install begins as soon as the CD is inserted into the drive. If autostart is not enabled, the silent install can be run by executing the setup.bat file from the root of the CD.
  
  cd /d g:\setup.bat

- From a distribution directory:
  If the package was placed in a shared directory called tdpdpkg 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:\tdpdpkg
  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 end 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 Web site at URL: http://support.installshield.com/default.asp and use the Search facility to obtain information on the error.
Appendix D. Examples of Tivoli Storage Manager policy binding using include/exclude and VSSPOLICY statements

To exploit automatic version control and expiration, you are able to set policy for each type of backup data. The method of setting policy is different for Legacy backups and VSS Backups:

- **Legacy backups**: Use INCLUDE/EXCLUDE statements in the Data Protection for SQL options file (dsm.opt by default).
- **VSS Backups**: Use the VSSPOLICY statement in the Data Protection for SQL configuration file (tdpsql.cfg by default).

**VSS examples**

VSS Backups use the VSSPOLICY statement in the Data Protection for SQL configuration file (see “Setting automatic expiration (VSS and Legacy)” on page 55 for the general syntax):

```
VSSPOLICY * * FULL TSM MC1
VSSPOLICY * * FULL LOCAL MC2
VSSPOLICY largdb1 FULL TSM MC3
VSSPOLICY largdb1 FULL LOCAL MC4
VSSPOLICY SERVER1 * FULL TSM MC5
VSSPOLICY SERVER1 * FULL LOCAL MC6
```

**Legacy examples**

Legacy backups use INCLUDE/EXCLUDE statements in the Data Protection for SQL options file (see “Setting automatic expiration (VSS and Legacy)” on page 55 for the general syntax):

<table>
<thead>
<tr>
<th>BackupType Object Matches</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>All objects</td>
<td>...*</td>
</tr>
<tr>
<td>All backupType objects</td>
<td>...\full*</td>
</tr>
<tr>
<td></td>
<td>...\diff*</td>
</tr>
<tr>
<td></td>
<td>etc.</td>
</tr>
<tr>
<td>All group or file object</td>
<td>...\g1\group*</td>
</tr>
<tr>
<td></td>
<td>...\f1\file*</td>
</tr>
<tr>
<td>All group or file object</td>
<td>...\g*\group*</td>
</tr>
<tr>
<td>names beginning with g or f</td>
<td>...\f*\file*</td>
</tr>
<tr>
<td>Same as ...\group* or ...\file*</td>
<td>...*\group*</td>
</tr>
<tr>
<td></td>
<td>...*\file*</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>BackupType Object with Database Matches</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>All objects with database name Db1</td>
<td>...\Db1...*</td>
</tr>
</tbody>
</table>
### BackupType Object with Database Matches

<table>
<thead>
<tr>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>All objects with database name Db1 beginning with Db</td>
</tr>
<tr>
<td>Ambiguous</td>
</tr>
<tr>
<td>All full or diff objects with database name Db1</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>All log, group, file, or set objects with database name Db1</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>All group or file object names (g1, f1) with database name Db1</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>All group or file object names beginning with g or f with database name Db1</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Same as ...\Db1...\group* or file*</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Same as ...\Db1\full*</td>
</tr>
<tr>
<td>Same as ...\full*</td>
</tr>
<tr>
<td>Same as ...\group*</td>
</tr>
<tr>
<td>Same as ...\g1\group*</td>
</tr>
<tr>
<td>Ambiguous</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Nothing (typeInfo missing)</td>
</tr>
</tbody>
</table>

### Meta & Data Object Matches

<table>
<thead>
<tr>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>All meta or data objects</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>All meta or data full, log, or group objects</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>All meta or data group object names (g1)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>All meta or data group object names beginning with g</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Same as ...\meta\data...\group*</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Nothing (qualifiers missing)</td>
</tr>
<tr>
<td>Meta &amp; Data Object with Database Matches</td>
</tr>
<tr>
<td>-----------------------------------------</td>
</tr>
<tr>
<td>All meta or data objects with database name Db1</td>
</tr>
<tr>
<td>All meta or data full objects with database name Db1</td>
</tr>
<tr>
<td>All meta or data log or group objects with database name Db1</td>
</tr>
<tr>
<td>All meta or data log or group objects with database name Db1</td>
</tr>
<tr>
<td>All meta or data group object names (g1) with database name Db1</td>
</tr>
<tr>
<td>All meta or data group object names beginning with g with database name Db1</td>
</tr>
<tr>
<td>Same as ...\meta \data \Db1 ... \group*</td>
</tr>
<tr>
<td>Same as ...\meta \data \Db1 ... \full*</td>
</tr>
<tr>
<td>Same as ...\meta \data \Db1 ... \group*</td>
</tr>
<tr>
<td>Same as ...\meta \data \Db1 ... \g1\group*</td>
</tr>
<tr>
<td>Ambiguous</td>
</tr>
<tr>
<td>Nothing (qualifiers missing)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Server Matches</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>All objects from all servers beginning with SQL</td>
<td>SQL*...*</td>
</tr>
<tr>
<td>All objects from all server instances with host SQL2000</td>
<td>SQL2000*...*</td>
</tr>
<tr>
<td>All objects from server SQL2000\INST1</td>
<td>SQL2000\INST1*...*</td>
</tr>
<tr>
<td>All objects from all servers beginning with SQL2000\INST</td>
<td>SQL2000\INST*...*</td>
</tr>
<tr>
<td>Same as SQL2000...*</td>
<td>SQL2000*...*</td>
</tr>
<tr>
<td>All meta or data objects from server SQL2000\INST1</td>
<td>SQL2000\INST1\meta...*</td>
</tr>
<tr>
<td>All meta or data objects from all named server instances with host SQL2000</td>
<td>SQL2000*\meta...*</td>
</tr>
<tr>
<td>etc.</td>
<td></td>
</tr>
<tr>
<td>Server Matches</td>
<td>Specification</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>All meta or data objects from all server instances with host SQL2000</td>
<td>SQL2000...\meta...*</td>
</tr>
<tr>
<td></td>
<td>etc.</td>
</tr>
<tr>
<td>All objects from server default instance (if no instance name matches ??ta)</td>
<td>SQL2000??ta\meta...*</td>
</tr>
<tr>
<td></td>
<td>SQL2000??ta\data...*</td>
</tr>
</tbody>
</table>
Appendix E. Restoring the master database

A damaged master database can result in the SQL Server failing to start, as well as a number of other error conditions. A special procedure is required to restore the master database. Note that during the process of rebuilding the master database, the SQL Server setup program drops and then recreates the msdb database so it must be restored along with the master database.

In general, the following steps are required:

1. Run the SQL Server setup program to rebuild the master database. You must rebuild using the same character set and sort order as the master database backup that will be restored.
2. Start the SQL Server in single-user mode. This can be done at a command prompt. See also Note 1 under Appendix F, “Setting user mode,” on page 217.
3. Use Data Protection for SQL to restore the master database.

   Note: When the master database has finished restoring, the SQL Server shuts itself down. As a result, an error message is generated stating that the connection was lost to the SQL Server. This is expected.
4. Restart the SQL Server normally (in multi-user mode).
5. Manually reapply any changes that were made to the master database after the date of the database backup used to do the restore operation.
6. Use Data Protection for SQL to restore the msdb database.

It is very important to keep an up-to-date backup of your master database because the master database contains the system catalog. The system catalog contains important information about the SQL Server configuration. Ensure that you back up the master database after any changes that update system tables. For example, back up the master database after any of these statements are used:

- ALTER DATABASE
- CREATE DATABASE
- DISK INIT
- DISK RESIZE
- DISK MIRROR
- DISK UNMIRROR
- DISK REMIRROR
- Various DBCC options such as SHRINKDB
- System stored procedure such as: sp_dropremotelogin, sp_addumpdevice, sp_dropdevice, sp_addlogin, sp_droprolog, sp_addserver, sp_dropserver, sp_addremotelogin

© Copyright IBM Corp. 1997, 2010
Appendix F. Setting user mode

Setting user mode may be necessary during certain restore procedures. For example:

- You need to change server configuration options.
- A damaged master database needs recovering.
- A system database needs to be restored.

These tasks may require starting a SQL Server instance in single-user mode. By placing SQL databases to be restored in single-user mode, you can avoid attempting such restores. If you are restoring the master database, you must place the SQL server in single-user mode. For additional information or assistance with SQL commands, contact Microsoft.

```
ALTER DATABASE DBNAME SET SINGLE_USER WITH ROLLBACK AFTER N SECONDS
```

This TRANSACT-SQL command forces users off the database and places it in single-user mode.

```
ALTER DATABASE DBNAME SET MULTI_USER
```

This TRANSACT-SQL command returns the database to multiple-user mode.

Note:

1. You can set a SQL server to single-user mode by using the -m SQL SERVER startup option when restarting the SQL server.
2. You can use the SQL stored procedure SP_WHO to determine which users are using the databases.
Appendix G. Restoring to an alternate machine

This procedure demonstrates how to restore a SQL database backup to an alternate SQL Server machine (or database) using the Data Protection for SQL GUI. Note that Data Protection for SQL must be installed on both machines. Note that unlike Legacy backups, VSS Backups cannot be restored into a SQL Server that has a different name.

This procedure uses the following terms:
- **source machine**: The machine from which the original backup (to be restored) was taken.
- **target machine**: The alternate machine to which the backup will be restored.

1. Copy the Data Protection for SQL options file (dsm.opt) from the source machine to the target machine. By default, the dsm.opt file is located in the `C:\Program Files\Tivoli\TSM\TOPSql` directory. If `passwordaccess generate` is specified in this dsm.opt file, it may be necessary to reset the password for this node on the Tivoli Storage Manager server.
2. Launch the Data Protection for SQL GUI on the target machine.
3. Click on the Restore Databases tab. If prompted, enter the password for this node.
4. Make sure that the necessary options are selected:
   - Select the **Wait for Tape Mounts for Restore** option.
   - Select the **Wait for Tape Mounts for File Information** option.
   - It may be necessary to select the **Show Active and Inactive** option in order to view the database to be restored.
   - If the database to be restored is going to replace an existing database on the target machine, select the **Replace** option.
5. Click the plus sign in the tree view to the left of the SQL Server from which you want to restore a database backup. The tree view expands to show the names of SQL Servers on that Tivoli Storage Manager node for which Data Protection for SQL backups exist. Click the plus sign in the tree view to the left of the SQL Server source machine that you want to restore from. The tree expands again and shows the databases available for restore processing.
6. Click the plus sign in the tree view to the left of the database that you want to restore. The database expands to show the types of backups available for restore. Select the database to be restored.
7. Right mouse-click on the selected database and use the **Relocate Settings** dialog to specify a new destination location in which to restore the database.
8. Click the Restore button to restore the database to the target machine.
Appendix H. Data Protection for SQL Messages

ACO0003S: An internal processing error has occurred.
   
   Explanation
   An internal processing error has occurred.
   
   System action
   Processing ends.
   
   User response
   Retry the operation. If this error persists, contact your service representative.

ACO0004E: An unknown error has been detected.
   
   Explanation
   An internal processing error has occurred that prevents the generation of a message for a return code.
   
   System action
   Processing continues.
   
   User response
   Retry the operation. If this error persists, contact your service representative.

ACO0005E: Out of memory. Stop other processes and try the operation again.
   
   Explanation
   The machine has run out of memory.
   
   System action
   Processing continues.
   
   User response
   Close unnecessary processes and try the operation again.
ACO0053E: License file *(licensefile)* could not be opened.

**Explanation**

An attempt to read from the license file failed.

**System action**

Processing ends.

**User response**

Install the product again. This ensures that the correct license file is installed.

ACO0054E: Read failure on license file *(licensefile).*

**Explanation**

An attempt was made to read from the license file. This attempt failed.

**System action**

Processing ends.

**User response**

Reinstall the product. This will ensure that the correct license file is installed.

ACO0055E: Write failure on license file *(licensefile).*

**Explanation**

An attempt to write to the license file failed.

**System action**

Processing ends.

**User response**

Make sure enough space exists on the workstation to write to the license file. If enough space exists, run the command again.

ACO0056E: Data in the license file *(licensefile)* is not in a valid format.

**Explanation**

An attempt to read information from the license file failed.

**System action**

Processing ends.

**User response**

Install the product again.
ACO0057E: The checksum in the license file (licensefile) does not match the license string text.

**Explanation**

An attempt was made to read information from the license file. The checksum was not valid so it appears that the license file is not at the correct level.

**System action**

Processing ends.

**User response**

Reinstall the product.

ACO0058E: The 'Try and Buy' license has expired.

**Explanation**

This 'Try and Buy' license that was detected has expired.

**System action**

Processing ends.

**User response**

This product is no longer valid for use. A valid license must be obtained before running the product.

ACO0100E: Incomplete command:

**Explanation**

This message displays the incomplete command that was entered.

**System action**

Processing ends.

**User response**

Re-enter the complete command.

ACO0101E: Invalid argument:

**Explanation**

This message displays the command that was entered, up to and including the invalid command or option argument that was detected.

**System action**

Processing ends.
User response

Re-enter the command specifying a valid argument for the command or option.

ACO0102E: Invalid command:

Explanation

This message displays the invalid command that was entered.

System action

Processing ends.

User response

Re-enter a valid command.

ACO0103E: Invalid option for the specified command:

Explanation

This message displays the command that was entered, up to and including the option that was detected as invalid for the command.

System action

Processing ends.

User response

Re-enter the command specifying valid command options.

ACO0104E: Invalid option:

Explanation

This message displays the command that was entered, up to and including the invalid option that was detected.

System action

Processing ends.

User response

Re-enter the command specifying valid command options.
ACO0105E: Missing argument:

Explanation

This message displays the command that was entered, up to and including the command or option whose required argument is missing.

System action

Processing ends.

User response

Re-enter the command specifying a valid argument for the command or option.

ACO0132W: Tracing could not be started. Processing will continue.

Explanation

A problem prevented tracing from beginning.

System action

Processing will continue with the command entered.

User response

Refer to the other messages that display with this message to determine the problem.

ACO0133W: Could not locate installation directory. Attempting to continue...

Explanation

An attempt was made to read the registry to determine where the Tivoli Data Protection application client was installed. This attempt failed.

System action

Processing will continue with the command entered.

User response

There should be other messages along with this one. Refer to the other messages to determine the problem. If the problem cannot be determined, it may be necessary to reinstall the application client code. This will ensure that the registry entries are set up correctly.
ACO0134W: Could not locate log directory. Processing will continue...

Explanation

An attempt was made to read the registry to determine where the Tivoli Data Protection application client log is located. This attempt failed.

System action

Processing will continue with the command entered.

User response

There should be other messages along with this one. Refer to the other messages to determine the problem. If the problem can not be determined, it may be necessary to reinstall the application client code. This will ensure that the registry entries are set up correctly.

ACO0150I: Operation canceled by user.

Explanation

The user has requested that the Data Protection for Microsoft SQL Server application client end by entering ctrl-C.

System action

Processing ends.

User response

None

ACO0151E: Errors occurred while processing the request.

Explanation

Attempting to process the request entered, an error occurred.

System action

Processing ends.

User response

Attempt to determine the source of the errors from viewing the log file. Correct the problems and try running the command again.
ACO0152I: Performance stats: seconds seconds spent in apicall API calls

Explanation
The indicated number of seconds were spent making API calls for the indicated system.

System action
Processing continues.

User response
None

ACO0153I: Performance stats: seconds seconds spent in function

Explanation
The indicated number of seconds were spent the named function.

System action
Processing continues.

User response
None

ACO0154E: The Data Protection for Microsoft SQL Server application client cannot work with the version of the Tivoli Storage Manager API you have installed. Please install version version.release.level or greater.

Explanation
The version of the Tivoli Storage Manager API currently installed on the system is older than the version used to build the Data Protection for Microsoft SQL Server application client.

System action
Processing ends.

User response
Install a version of the Tivoli Storage Manager API at or later than the indicated level. A copy is distributed with the Data Protection for Microsoft SQL Server application client.
ACO0155E: The Data Protection for Microsoft SQL Server application client cannot work with the release of Tivoli Storage Manager API you have installed. Please install release version.release.level or greater.

**Explanation**

The release of the Tivoli Storage Manager API currently installed on the system is older than the release used to build the Data Protection for Microsoft SQL Server application client.

**System action**

Processing ends.

**User response**

Install a release of the Tivoli Storage Manager API at or later than the indicated level. A copy is distributed with the Data Protection for Microsoft SQL Server application client.

---

ACO0156E: Could not load the Tivoli Storage Manager API.

**Explanation**

The Tivoli Storage Manager API could not be loaded.

**System action**

Processing ends.

**User response**

Ensure the Tivoli Storage Manager API is correctly installed. Run the Data Protection for Microsoft SQL Server application client with the /TRACEFLAGS=API /TRACEFILE=filename options and view the tracefile to determine why it could not be loaded. Another possible cause is that the TSMAPI.DLL does not exist in the system directory. Re-install the Tivoli Storage Manager API, if this is the case.

---

ACO0160E: An authentication error occurred with your stored Tivoli Storage Manager password.

**Explanation**

You were unable to log on to the Tivoli Storage Manager server due an authentication error.

**System action**

Processing stops.
User response

The stored Tivoli Storage Manager password may have become corrupted. Contact your Tivoli Storage Manager server administrator.

**ACO0161E: Authentication error. The password entered is not valid. You are not logged on to the Tivoli Storage Manager server.**

**Explanation**

An incorrect password was entered.

**System action**

Processing stops.

**User response**

Enter the correct Tivoli Storage Manager password and try again.

**ACO0162E: The passwords entered do not match. Please enter them again.**

**Explanation**

An incorrect password was entered.

**System action**

Processing stops.

**User response**

Enter the passwords again.

**ACO0163E: The directory path needs to be fully-qualified.**

**Explanation**

The /intopath option was specified without a fully-qualified path.

**System action**

Processing stops.

**User response**

Enter the command again and specify a fully-qualified path in the /intopath option.
ACO0167E: The fully-qualified file name is too long.

Explanation

An attempt was made to use a fully-qualified file name that was too long. This attempt failed.

System action

Processing ends.

User response

None

ACO0200E: File (filename) could not be opened for reading.

Explanation

An attempt was made to open a file for reading. This attempt failed.

System action

Processing ends.

User response

None

ACO0201E: File (filename) could not be opened for writing.

Explanation

An attempt was made to open a file for writing. This attempt failed.

System action

Processing ends.

User response

None

ACO0202E: Read failure on file (filename).

Explanation

An attempt was made to read from a file. This attempt failed.

System action

Processing ends.

User response

None
ACO0203E: Write failure on file (*filename*).

**Explanation**

An attempt was made to write to a file. This attempt failed.

**System action**

Processing ends.

**User response**

None

ACO0204E: File (*filename*) could not be closed.

**Explanation**

An attempt was made to close a file. This attempt failed.

**System action**

Processing ends.

**User response**

None

ACO0205E: File (*filename*) statistics could not be obtained.

**Explanation**

An attempt was made to obtain file statistics. This attempt failed.

**System action**

Processing ends.

**User response**

None

ACO0206E: Directory (*directory*) could not be created.

**Explanation**

An attempt was made to create a directory. This attempt failed.

**System action**

Processing ends.

**User response**

None
ACO0207E: Directory path (directorypath) is too long.

Explanation
An attempt was made to use a directory path that was too long. This attempt failed.

System action
Processing ends.

User response
None

ACO0208E: There is not enough disk space for the operation attempted.

Explanation
An attempted operation required more disk space than was available. The attempt failed.

System action
Processing ends.

User response
None

ACO0209E: The rename of file (filename1) to (filename2) failed.

Explanation
An attempt was made to rename a file. This attempt failed.

System action
Processing ends.

User response
None

ACO0210E: The Tivoli Storage Manager high level qualifier is too long.

Explanation
An attempt was made to use a Tivoli Storage Manager high level qualifier that was too long. This attempt failed.

System action
Processing ends.
**ACO0211E: The Tivoli Storage Manager low level qualifier is too long.**

**Explanation**

An attempt was made to use a Tivoli Storage Manager low level qualifier that was too long. This attempt failed.

**System action**

Processing ends.

**User response**

None

**ACO0212E: The Tivoli Storage Manager filespace name is too long.**

**Explanation**

An attempt was made to use a Tivoli Storage Manager filespace name that was too long. This attempt failed.

**System action**

Processing ends.

**User response**

None

**ACO0213E: The maximum number of objects allowed per Tivoli Storage Manager transaction is too small.**

**Explanation**

In order to maintain backup data integrity, multiple backup objects are sent to the Tivoli Storage Manager server in a single transaction. The Tivoli Storage Manager server has indicated that the maximum number of objects allowed per transaction is less than the minimum required by the Data Protection for Microsoft SQL Server application client.

**System action**

Processing ends.

**User response**

Increase the maximum number of objects allowed per transaction on the Tivoli Storage Manager server and retry the operation.
ACO0214E: The backup object's management class backup copy group does not exist.

Explanation

The Tivoli Storage Manager server has indicated that the backup object's management class backup copy group does not exist.

System action

Processing ends.

User response

Contact your Tivoli Storage Manager server administrator.

ACO0215E: All backup objects do not have the same management class backup copy destination.

Explanation

In order to maintain backup data integrity, multiple backup objects are sent to the Tivoli Storage Manager server within a single transaction. All backup objects within a single transaction are required to have the same management class backup copy destinations.

System action

Processing ends.

User response

Contact your Tivoli Storage Manager server administrator.

ACO0216E: Unable to obtain space information for volume (volumename).

Explanation

An attempt was made to obtain space information for a volume. This attempt failed.

System action

Processing ends.

User response

None
ACO0217E: The Tivoli Storage Manager file space name is invalid.

Explanation
The file space name or directory delimiter is invalid.

System action
Processing ends.

User response
Check that the file space name length, characters, and directory delimiters are valid.

ACO0218E: The Tivoli Storage Manager high level qualifier is invalid.

Explanation
The high level qualifier name or directory delimiter is invalid.

System action
Processing ends.

User response
Check that the high level qualifier name length, characters, and directory delimiters are valid.

ACO0219E: The Tivoli Storage Manager low level qualifier is invalid.

Explanation
The low level qualifier name or directory delimiter is invalid.

System action
Processing ends.

User response
Check that the low level qualifier name length, characters, and directory delimiters are valid.

ACO0256E: The password in your Tivoli Storage Manager options file has expired. Please change your password on the Tivoli Storage Manager server using the 'change password' command and then either change or remove the password value in your options file.

Explanation
Your Tivoli Storage Manager password has expired. You need to change your password.
System action
Processing ends.

User response
Obtain a new password for your Tivoli Storage Manager server; node using the change password command or by asking your Tivoli Storage Manager Administrator to change your password.

ACO0257E: Your password has expired.

Explanation
Your Tivoli Storage Manager password has expired. A new password needs to be obtained.

System action
Processing ends.

User response
Obtain a new password for your Tivoli Storage Manager node using the change password command or by asking your Tivoli Storage Manager Administrator to change your password.

ACO0258E: You did not enter a valid password. Processing ends.

Explanation
The password that was entered was not a valid password.

System action
Processing ends.

User response
Re-enter the command specifying a valid password.

ACO0259E: The password you entered for verification does not match the password you entered for your new password. Your password will not be changed.

Explanation
The password you entered for verification of your new password does not match the new password that was entered.

System action
Processing ends.
User response

Try again to change your password being sure to enter the same password for the new password and for the verification password.

**ACO0260I: Password successfully changed.**

**Explanation**

The change password command completed successfully

**System action**

Processing ends.

**User response**

None

**ACO0261I: There are no backups for the server named servername.**

**Explanation**

There are no backups on the Tivoli Storage Manager server for the specified server name.

**System action**

Processing ends.

**User response**

None

**ACO0263E: Failed to start Web browser with a return code of returncode.**

**Explanation**

An attempt was made to start the web browser to view the TSM HTML book. This attempt failed.

**System action**

Processing ends.

**User response**

Start your web browser manually and point it to bookfrm.htm in the agent htm directory.
ACO0264I: Could not find the default browser defined. An attempt will be made to use Microsoft Internet Explorer.

Explanation

An attempt was made to read the registry to determine the default browser. However, a default browser is not defined. A determination will be made where Microsoft Internet Explorer is installed.

System action

Processing continues.

User response

It is possible that a default browser is not defined for the system. This is okay. An attempt will be made to use Microsoft Internet Explorer.

ACO0265E: Could not find Internet Explorer.

Explanation

An attempt was made to read the registry to determine where Microsoft's Internet Explorer was installed. This attempt failed.

System action

Processing ends.

User response

Make sure that the registry is set up correctly for Internet Explorer.

ACO0266E: Could not find the Tivoli Storage Manager HTML books.

Explanation

An attempt was made to read the registry to determine where the Tivoli Storage Manager books were installed. This attempt failed.

System action

Processing ends.

User response

It may be necessary to reinstall the application client code. This will ensure that the registry entries are set up correctly.
ACO0267E: The verify password entered does not match the new password entered.

**Explanation**
The verify password does not match the new password.

**System action**
Processing ends.

**User response**
Retry the command with a matching verify password.

ACO0300E: Invalid restore type.

**Explanation**
The type of restore requested is invalid.

**System action**
Processing ends.

**User response**
Re-enter the command specifying a valid restore type.

ACO0301E: Invalid backup type.

**Explanation**
The type of backup requested is invalid.

**System action**
Processing ends.

**User response**
Re-enter the command specifying a valid backup type.

ACO351E: Invalid trace keyword - 'keyword'

**Explanation**
A TRACEFLAG option in the user configuration file or on the command line is incorrect.

**System action**
Client program did not initialize or tracing was not enabled in the applet.
**User response**

Correct the value.

**ACO357E: Unable to open trace output file file-name.**

**Explanation**

A TRACEFILE option in the user configuration file or on the command line used a directory path and file-name combination to which you do not have write access.

**System action**

Client program did not initialize.

**User response**

Change the TRACEFILE value so that it is a location to which you have write access.

**ACO366E: Unable to close trace output file file-name.**

**Explanation**

An error occurred during the closing of a trace output file-name (for example, not enough disk space).

**System action**

Processing continues.

**User response**

Check the options.doc file for a description of possible causes of the error, or see your system administrator.

**ACO367E: Unable to write to trace file tracefile. Tracing disabled.**

**Explanation**

An error occurred when writing to the specified tracefile.

**System action**

Tracing is disabled. Processing continues.

**User response**

Ensure the device that the tracefile access is available and has sufficient space for the tracefile. Retry the command.
ACO368E: Invalid trace file name (name too long).

**Explanation**
A TRACEFILE option in the preferences files used a file name that is too long.

**System action**
Client program did not initialize.

**User response**
Change the file name used as the TRACEFILE so that it is equal to or less than 255 characters in length.

ACO383E: Specifying the trace file 'link' as a symbolic link is not allowed.

**Explanation**
Trace file 'linkname' cannot be a symbolic link.

**System action**
The symbolic link 'linkname' is deleted, the trace file is recreated, and processing stops.

**User response**
Specify the trace file location with the 'tracefile' option.

ACO384E: Symbolic link 'linkname' to 'target' was successfully deleted.

**Explanation**
Log 'linkname' cannot be a symbolic link.

**System action**
The symbolic link 'linkname' is deleted, the log is recreated, and processing stops.

**User response**
Check the location of the new file. To specify the location of log files, refer to the user's manual for the 'errorlogname' option, the 'schedlogname' option, and the 'DSM_LOG' environmental variable.
ACO385E: Unable to delete symbolic link 'link'.

Explanation

Log 'linkname' cannot be a symbolic link.

System action

Processing stops.

User response

Delete the symbolic link 'linkname'.

ACO476E: program-name: cannot open file file-spec: error.

Explanation

TDP cannot open the file.

System action

TDP cannot complete the requested operation.

User response

Retry the operation. If the problem continues, check with your system administrator.

ACO487E: Specifying the error log 'link' as a symbolic link is not allowed.

Explanation

Error log 'linkname' cannot be a symbolic link.

System action

The symbolic link 'linkname' is deleted, the error log is recreated, and processing stops.

User response

Check the location of the new error log. To specify the location of the error logs, refer to the user's manual for the 'errorlogname' option and 'DSM_LOG' environmental variable.
ACO488E: Initialization functions cannot open the error log: log-name.
\textit{errno = \textit{errno-value}},

\textbf{Explanation}

The file \textit{log-name} could not be opened during initialization. The system set the
error code \textit{errno-value}. If the reason given is "access denied," the current user does
not have permission to write to the log in the directory specified. It is also possible
that no space is available at the given log location.

\textbf{System action}

Processing terminates.

\textbf{User response}

Set the DSM_LOG (or DSMI_LOG) environment variable to a directory into which
the current user can write. You may also use the ERRORLOGNAME option to
specify a file to which the current has write permission.

ACO495E: Failure writing to a Tivoli Storage Manager log or
log-related file: file-name, \textit{errno = \textit{errno-value, reason}}

\textbf{Explanation}

A failure was encountered when writing to one of the log files or a related file
named \textit{file-name}. The system set the error code \textit{errno-value}. \textit{Reason} is the system
explanation of that error code. Among other things, it is possible that no space is
available at the given log location.

\textbf{System action}

Processing terminates.

\textbf{User response}

Set the DSM_LOG (or DSMI_LOG) environment variable to a directory with
adequate space to write the log data.

ACO496I: TDP is converting the \textit{log-file} from continuous (pruning)
mode to wrapping mode. This process may take several minutes.

\textbf{Explanation}

The \textit{log-file} was previously in continuous mode where the only size control was
through the use of ERRORLOGRETENTION or SCHEDLOGRETENTION option.
This is the first occasion where ERRORLOGMAX or SCHEDLOGMAX is specified
for this log, so its format must be changed and old data saved.

\textbf{System action}

Transition processing continues.
ACO497I: TDP is converting the log-file from wrapping mode to continuous (pruning) mode. This process may take several minutes.

**Explanation**

The log-file was previously in wrapping mode where the size control was through the use of the ERRORLOGMAX or SCHEDLOGMAX option. This is the first occasion where ERRORLOGMAX or SCHEDLOGMAX is not specified for this log, so its format must be changed and old data saved.

**System action**

Transition processing continues.

**User response**

None.

ACO498I: count log records processed.

**Explanation**

This is just a progress report to let you know the process is still ongoing.

**System action**

Transition processing continues.

**User response**

None.

ACO501E: Invalid Proxy Configuration Detected: Target Node 'targetnode' is not listed as a valid node to proxy to for Node Name 'nodename'.

**Explanation**

The proxy node configuration on the TSM Server is not correct to support this VSS operation.

**System action**

The VSS operation stops.

**User response**

Contact the TSM Server administrator to have the correct TSM Server GRANT PROXY commands issued to enable proxy authority for the nodes. If the error persists, contact your service representative.
ACO501T: Invalid Proxy Configuration Detected: Target Node 'targetnode' is not listed as a valid node to proxy to for Node Name 'nodename'.

**Explanation**

The proxy node configuration on the TSM Server is not correct to support this VSS operation.

**System action**

The VSS operation stops.

**User response**

Contact the TSM Server administrator to have the correct TSM Server GRANT PROXY commands issued to enable proxy authority for the nodes. If the error persists, contact your service representative.

---

ACO515E: Invalid DSMAGENT Node configuration found for node 'dsmagentnode'.

**Explanation**

The DSMAGENT Node specified is not configured properly.

**System action**

The VSS operation stops.

**User response**

Verify that the DSMAGENT Node specified is correct and that the Client Acceptor Daemon (CAD) is running for the DSMAGENT Node. If the error persists, contact your service representative.

---

ACO516I: The Windows console event handler received a 'event' console event.

**Explanation**

A console event was received by one of the Data Protection for Microsoft SQL Server processes or programs. The following events can be received:
- Ctrl-C - This indicates either the user entered the ctrl-c sequence or that one of the Windows services was stopped.

**System action**

None.

**User response**

None.
ACO517I: An unexpected error was encountered. TDP function name : function-name TDP function : function-desc TDP return code : TSM-rc TDP file : file-name (line-number)

Explanation

None.

System action

Processing stops.

User response

Contact the TDP administrator with the information provided in this message.

ACO518E: Backups selected for restore must have the same backup location (TSM or LOCAL).

Explanation

A VSS restore operation was submitted that specified multiple backup objects. The backup objects chosen had different backup locations. This is not allowed. All backup objects submitted in the same VSS restore operation must have the same backup location, either TSM or LOCAL, but not both.

System action

The VSS restore operation stops.

User response

Retry the VSS restore operation specifying one backup object at a time.

ACO519E: The VSS operation failed with rc = returncode.

Explanation

There was a failure when TSM performed the VSS operation.

System action

The VSS operation stops.

User response

Verify that the TSM Client Acceptor Daemon (CAD) is installed, configured, and running properly on the machine. Retry the operation. If the error persists, contact your service representative.
ACO520E: Failed to connect to Local DSMAGENT Node
'localdsmagentnode' at address:port 'address:portnumber'. Verify that the
TSM Client Acceptor Daemon (CAD) is installed, configured, and
running properly.

**Explanation**

An attempt was made to connect to the TSM Client Acceptor Daemon (CAD)
running on the local machine. A communication error occurred when this
connection was attempted.

**System action**

The operation stops.

**User response**

In order to perform VSS operations, you must have a TSM Client Acceptor
Daemon (CAD) and a TSM Remote Client Agent Service (DSMAGENT) installed
and configured properly. In addition, the TSM Client Acceptor Daemon (CAD)
must be running. Verify that the TSM Client Acceptor Daemon (CAD) is installed,
classified, and running properly on the local machine. If the error persists,
contact your service representative.

ACO521E: Pruning functions cannot open one of the Tivoli Storage
Manager prune files: *log-name*. *errno* = *errno-value*,

**Explanation**

The file "*log-name*" could not be opened during pruning. The system set the error
code *errno-value*. If the reason given is "access denied," the current user does not
have permission to write to the file in the directory specified. It is also possible
that no space is available at the given file location or another Tivoli Storager
Manager process started by different user id is performing pruning at the same
time.

**System action**

Pruning stops, processing continues.

**User response**

Set the DSM_LOG (or DSMI_LOG) environment variable to a directory into which
the current user can write.
ACO3000I: Data Protection for SQL: Starting backup type backup of database database name from server server name.

Explanation
This is an informational message written to the Tivoli Storage Manager Server activity log when a backup is started.

System action
None

User response
None Centrally logged

ACO3001I: Data Protection for SQL: backup type backup of database database name from server server name completed successfully.

Explanation
This is an informational message written to the Tivoli Storage Manager Server activity log when a database backup completes successfully.

System action
None

User response
None Centrally logged

ACO3002E: Data Protection for SQL: backup type backup of database database name from server server name failed, rc = return code.

Explanation
This is an informational message written to the Tivoli Storage Manager Server activity log when a database restore fails.

System action
None

User response
None Centrally logged
ACO3003I: Data Protection for SQL: Starting restore type restore of backup object object name to database database name on server server name.

Explanation
This is an informational message written to the Tivoli Storage Manager Server activity log when a restore is started.

System action
None

User response
None Centrally logged

ACO3004I: Data Protection for SQL: restore type restore of backup object object name to database database name on server server name completed successfully.

Explanation
This is an informational message written to the Tivoli Storage Manager Server activity log when a database restore completes successfully.

System action
None

User response
None Centrally logged

ACO3005E: Data Protection for SQL: restore type restore of backup object object name to database database name on server server name failed.

Explanation
This is an informational message written to the Tivoli Storage Manager Server activity log when a database restore fails.

System action
None

User response
None Centrally logged
ACO3006I: Data Protection for SQL: Starting backup for server *servername*.

**Explanation**

This is an informational message written to the Tivoli Storage Manager Server activity log indicating the start of a backup.

**System action**

None

**User response**

None

Centrally logged

ACO3007I: Data Protection for SQL: Backup of server *servername* is complete. Total SQL backups selected: *number selected* Total SQL backups attempted: *number attempted* Total SQL backups completed: *number completed* Total SQL backups excluded: *number excluded* Throughput rate: *rate* Kb/Sec Total bytes transferred: *bytes* Elapsed processing time: *time* Secs

**Explanation**

This is an informational message written to the Tivoli Storage Manager Server activity log indicating the end of a backup request.

**System action**

None

**User response**

None

Centrally logged

ACO3008I: Data Protection for SQL: Backup of server *servername* is complete. Total SQL backups selected: *number selected* Total SQL backups attempted: *number attempted* Total SQL backups completed: *number completed* Total SQL backups excluded: *number excluded* Total SQL backups inactivated: *number inactivated* Throughput rate: *rate* Kb/Sec Total bytes transferred: *bytes* Elapsed processing time: *time* Secs

**Explanation**

This is an informational message written to the Tivoli Storage Manager Server activity log indicating the end of a backup request.
ACO3009I: Data Protection for SQL: backup type backup of database
database name from server server name canceled by user.

Explanation
This is an informational message written to the Tivoli Storage Manager Server
activity log indicating that a backup request was canceled by the user.

System action
None

User response
None

Centrally logged

ACO3010I: Data Protection for SQL: Starting restore for server
servername.

Explanation
This is an informational message written to the Tivoli Storage Manager Server
activity log indicating the start of a restore.

System action
None

User response
None

Centrally logged

ACO3011I: Data Protection for SQL: Restore from server server name
to server server name is complete. Total database backups inspected:
number inspected Total database backups requested for restore: number
requested Total database backups restored: number restored Total
database skipped: number skipped Throughput rate: rate Kb/Sec Total
bytes transferred: bytes Elapsed processing time: time Secs

Explanation
This is an informational message written to the Tivoli Storage Manager Server
activity log indicating the end of a restore.
ACO3012I: Data Protection for SQL: restore type restore of backup object object name to database database name from server server name canceled by user.

Explanation
This is an informational message written to the Tivoli Storage Manager Server activity log indicating that a backup request was canceled by the user.

System action
None

User response
None

Centrally logged

ACO3013I: Data Protection for SQL: Starting Inactivate processing for backup objects from server servername

Explanation
This is an informational message written to the Tivoli Storage Manager Server activity log when an inactivate process begins.

System action
None

User response
None

Centrally logged

ACO3014I: Data Protection for SQL: Inactivate processing complete Total database backups inspected: number inspected Total database backups requested for inactivation: number requested Total database backups inactivated: number inactivated Total database skipped: number skipped Elapsed processing time: time Secs

Explanation
This is an informational message written to the Tivoli Storage Manager Server activity log to indicate the end of an inactivate command.
ACO3015I: Data Protection for SQL: Inactivating backup type backup backup object.

**Explanation**
This is an informational message written to the Tivoli Storage Manager Server activity log when an inactivation of a backup object is started.

**System action**
None

**User response**
None

ACO5050I: A new configuration file was created.

**Explanation**
The file specified in the /configfile parameter does not exist. A new file was created.

**System action**
Processing continues.

**User response**
None.

ACO5051I: The configuration file cannot be found, using default settings.

**Explanation**
The file specified in the /configfile parameter cannot be found.

**System action**
Processing continues.

**User response**
Ensure the correct file name is specified.
ACO5052E: An error occurred trying to set the requested configuration option.

Explanation
An error occurred while writing to the configuration file.

System action
Processing ends.

User response
View any other messages that were displayed. After reviewing the messages and performing necessary actions, run the command again.

ACO5053E: The value for the option option is not valid. See the TDPSQLC Help Set output or the User's Guide for valid Set command parameters.

Explanation
The configuration option being set is not valid.

System action
Processing ends.

User response
Run "TDPSQLC Help Set" or refer to the User's Guide for valid Set command parameters.

ACO5054I: The configuration option was set successfully.

Explanation
The configuration option specified on the Set command was set successfully.

System action
Processing ends.

User response
None
ACO5056I: The log file could not be pruned. Processing will continue.

**Explanation**

An attempt to prune the log was unsuccessful.

**System action**

Processing continues.

**User response**

The log file may not exist. If the log file exists, view the log for indications of possible problems.

ACO5057I: The log file was pruned successfully.

**Explanation**

The log file mentioned pruned successfully.

**System action**

Processing continues.

**User response**

None.

ACO5058W: The log file name is greater than the maximum allowed. Processing will continue using a log file name of log file in the current directory.

**Explanation**

The logfile name entered was not fully qualified. When the fully qualified log file name was created, it was longer than the possible length of a log file.

**System action**

Processing continues by creating and using a log file in the current directory.

**User response**

Consider updating the log file name using a fully qualified path.
ACO5059W: The \textit{log file} log file cannot be opened for writing. There will be no logging of events.

\textbf{Explanation}

The log mentioned could not be opened for appends. Therefore, no logging is performed.

\textbf{System action}

Processing continues without logging.

\textbf{User response}

Determine why the log file could not be opened. The log file may refer to a non-existent drive or partition, or the log file is marked read-only.

ACO5060E: A Tivoli Storage Manager API error has occurred.

\textbf{Explanation}

A Tivoli Storage Manager API error has occurred.

\textbf{System action}

Processing ends.

\textbf{User response}

Retry the operation. If the error persists, contact your service representative.

ACO5061E: A Microsoft SQL API error has occurred.

\textbf{Explanation}

A Microsoft SQL API error occurred.

\textbf{System action}

Processing ends.

\textbf{User response}

Retry the operation. If the error persists, contact your service representative.

ACO5063I: The \textit{log file name} log file did not need pruning.

\textbf{Explanation}

The log file specified did not need to be pruned.

\textbf{System action}

Processing continues.
User response

The log file will automatically be pruned at a later date. If the log file is currently too large, decrease the number of days the log entries are retained.

ACO5064W: The `logfile_name` log file could not be opened for writing. The log was not pruned and there will be no logging of events.

Explanation

The log mentioned could not be opened for appends. Therefore, no logging or pruning is performed.

System action

Processing continues without logging and without pruning.

User response

Determine why the log file could not be opened. The log file may refer to a non-existent drive or partition, or the log file is marked read-only.

ACO5065E: The value specified for the `/SQLUser` option does not match the registry entry.

Explanation

A Backup, Restore or Query Sql command was issued with both the `/SQLAUTHentication=SQLUserid` and the `/SQLUser` option specified. An attempt was made to obtain the `sqlpassword` value from the registry but the user ID in the registry does not match the user ID specified with the `/sqluser` option.

System action

Processing ends.

User response

Issue the command and either specify the `/sqluser` value which matches the registry entry or specify the desired values for both the `/sqluser` and `/sqlpassword` options on the command.

ACO5091E: PASSWORDACCESS is Generate. Either the stored password is incorrect or there is no stored password. If you do not have a stored password, use the `-TSMPassword=xxx` option to set and store your password.

Explanation

The PASSWORDACCESS option is set to generate in the client options file. However, no password is stored. An initial password needs to be stored.
System action

Processing ends.

User response

Invoke the command again using the -TSMPassword option. Any subsequent commands should now complete without specifying a password.

ACO5097I: Data Protection for SQL is not configured for VSS operations.

Explanation

Data Protection for SQL has not been configured to perform VSS operations.

System action

None.

User response

In order to perform VSS operations, there must be a valid Tivoli Storage Manager Advanced Copy Services license installed and the Data Protection for SQL LOCALDSMAGENTNODE preference must be set correctly. Refer to the Data Protection for SQL User’s Guide for details on configuring the client for VSS operations.

ACO5098E: Error obtaining VSS information from Local DSMAgent Node: 'localdsmagentnode'.

Explanation

Data Protection for SQL attempted to obtain VSS information through the specified LOCALDSMAGENTNODE but failed. The error message encountered is also displayed.

System action

VSS information is not displayed.

User response

Refer to the error message displayed along with this message.

ACO5124E: Invalid command. Data Protection for SQL only supports VSS backup type of FULL.

Explanation

An invalid backup type was specified on the VSS backup request. Data Protection for SQL supports backup types of FULL when using the VSS backup method.
System action
The backup operation is canceled.

User response
Retry the backup operation specifying a supported VSS backup type.

ACO5125E: Invalid command. Data Protection for SQL does not support OFFLOAD with the Legacy backup method.

Explanation
The OFFLOAD option was specified when using the Legacy backup method. Data Protection for SQL does not support offload with the Legacy backup method. Data Protection for SQL supports offload with the VSS backup method only.

System action
The backup operation is canceled.

User response
Retry the backup operation without specifying the offload option or by specifying the VSS backup method.

ACO5126E: Invalid command. Data Protection for SQL only supports Legacy backups with a backup destination of TSM.

Explanation
An invalid backup destination was specified with the Legacy backup method. Data Protection for SQL only supports a backup destination of TSM when using the Legacy backup method.

System action
The backup operation is canceled.

User response
Retry the backup operation specifying a backup destination of TSM.

ACO5127E: Invalid command. Data Protection for SQL does not support OFFLOAD with the specified backup destination.

Explanation
The OFFLOAD option was specified with an unsupported backup destination. Data Protection for SQL only supports offload with a backup destination of TSM.

System action
The backup operation is canceled.
User response

Retry the VSS offloaded backup operation specifying a backup destination of TSM.

ACO5128E: The VSS operation failed with rc = returncode.

Explanation

There was a failure when Data Protection for SQL performed the VSS operation.

System action

The VSS operation stops.

User response

Verify that the Client Acceptor Daemon (CAD) is installed, configured, and running properly on the machine. Retry the operation. If the error persists, contact your service representative.

ACO5129E: Data Protection for SQL is unable to run VSS operations. A valid VSS license file (acssql.lic) could not be located.

Explanation

In order to perform VSS operations, Data Protection for SQL a valid and that the Tivoli Storage Manager for Advanced Copy Services - MS Exchange VSS Integration Module is installed. If the Tivoli Storage Manager for Advanced Copy Services - MS Exchange VSS Integration Module is installed, there will be a license file, acsexcl.lic, in the Data Protection for SQL installation directory.

System action

The operation stops.

User response

Verify that the prerequisites identified above are met and retry the operation. If the error persists, contact your service representative.

ACO5170E: Missing, blank, or invalid Local DSMAGENT Node Name is not allowed.

Explanation

In order to run VSS operations, Data Protection for SQL verifies that the Local DSMAGENT Node Name is specified and valid. This error indicates that the Local DSMAGENT Node Name is missing, blank, or invalid.

System action

The operation stops.
User response

Set the Local DSMAGENT Node Name to a valid value and retry the operation.

ACO5171E: Invalid command. Data Protection for SQL only supports restoring VSS backup types of FULL and COPY.

Explanation

An invalid backup type was specified on the VSS restore request. Data Protection for SQL supports restoring backups of type FULL and COPY.

System action

The restore operation is canceled.

User response

Retry the restore operation specifying a supported VSS backup type.

ACO5177E: Invalid DSMAGENT Node configuration found for node 'dsmagentnode'.

Explanation

The DSMAGENT Node specified is not configured properly.

System action

The VSS operation stops.

User response

Verify that the DSMAGENT Node specified is correct and that the Client Acceptor Daemon (CAD) is running for the DSMAGENT Node. If the error persists, contact your service representative.

ACO5186E: The VSS writer didn't return any selectable backup components for the specified database(s). Ensure that the SQL Server VSS writer service has been started.

Explanation

The SQL Server VSS writer service didn't return any selectable backup components for the specified database(s).

System action

Backup fails, processing ends.

User response

Ensure that the SQL Server VSS writer service has been started and that service start type is set to automatic.
ACO5187E: Multiple backup objects with conflicting backup destinations were found for one or more of the specified database(s). The /OBJECT and/or /BACKUPDESTINATION options should be used to restore a specific database.

**Explanation**

The backup object specified for the VSS restore operation was not specific enough to be unique. More information is required in order to restore the correct backup object.

**System action**

The restore operation is canceled.

**User response**

Retry the restore operation specifying the /OBJECT= and /BACKUPDESTINATION parameters.

ACO5188E: BOTH may not be specified for /BACKUPDESTINATION, only TSM or LOCAL are valid.

**Explanation**

The restore command only allows specifying backup destinations of TSM or LOCAL for identifying database(s) to restore.

**System action**

The restore operation is canceled.

**User response**

Retry the restore operation specifying TSM or LOCAL with /BACKUPDESTINATION parameters.

ACO5204E: One or more of the specified databases do not exist or are unavailable for backup.

**Explanation**

A request was made to backup SQL database(s) which doesn't exist or isn't available.

**System action**

Processing ends.

**User response**

Ensure that all of the databases exist and are available and restart the backup.
ACO5400E: The Virtual Device Interface is not registered with the Common Object Model.

**Explanation**

The virtual device interface could not be created because it is not registered with the common object model. The SQL server may not be installed properly.

**System action**

Processing ends.

**User response**

Verify that the SQL server is installed properly and retry the operation. Contact your service representative if the error persists.

ACO5401E: The Virtual Device Interface could not be created.

**Explanation**

The virtual device interface could not be created. The SQL server virtual device interface log or Windows NT event log may contain more information.

**System action**

Processing ends.

**User response**

If the SQL server messages do not resolve the problem, retry the operation. Contact your service representative if the error persists.

ACO5402E: The Virtual Device Set could not be created.

**Explanation**

The virtual device set could not be created. The SQL server virtual device interface log or Windows NT event log may contain more information.

**System action**

Processing ends.

**User response**

If the SQL server messages do not resolve the problem, retry the operation. Contact your service representative if the error persists.
ACO5403E: The configuration of the Virtual Device Set could not be obtained.

Explanation

The configuration of the virtual device set could not be obtained. The SQL server virtual device interface log, SQL server activity log, SQL server error log, or Windows NT event log may contain more information.

System action

Processing ends.

User response

If the SQL server messages do not help resolve the problem retry the operation. If the error persists, contact your service representative.

ACO5404E: The Virtual Device Set could not open a virtual device.

Explanation

The virtual device set could not open a virtual device. The SQL server virtual device interface log, SQL server activity log, SQL server error log, or Windows NT event log may contain more information.

System action

Processing ends.

User response

If the SQL server messages do not resolve the problem, retry the operation. Contact your service representative if the error persists.

ACO5405E: An unknown virtual device error has been detected.

Explanation

A virtual device returned an unknown return code. The SQL server virtual device interface log, SQL server activity log, SQL server error log, or Windows NT event log may contain more information.

System action

Processing ends.

User response

If the SQL server messages do not resolve the problem, retry the operation. Contact your service representative if the error persists.
ACO5406E: The SQL server closed a virtual device prematurely.

Explanation
The SQL server aborted the operation on the selected database. The SQL server virtual device interface log, SQL server activity log, SQL server error log, or Windows NT event log may contain more information.

System action
Processing ends.

User response
If the SQL server messages do not resolve the problem, retry the operation. Contact your service representative if the error persists.

ACO5407E: The SQL server aborted the operation.

Explanation
The SQL server aborted the operation on the selected database. The SQL server virtual device interface log, SQL server activity log, SQL server error log, or Windows NT event log may contain more information.

System action
Processing ends.

User response
If the SQL server messages do not resolve the problem, retry the operation. Contact your service representative if the error persists.

ACO5420E:

Explanation
A SQL API error has occurred.

System action
Processing for this operation ends.

User response
If the SQL server messages do not resolve the problem, retry the operation. Contact your service representative if the error persists.
ACO5421E: Received the following from the MS COM component: SQL message

Explanation
A SQL error has occurred.

System action
Processing for this operation ends.

User response
If the SQL server messages do not resolve the problem, retry the operation. Contact your service representative if the error persists.

ACO5422E: Received the following from the MS SQL server: SQL message

Explanation
A SQL error has occurred.

System action
Processing for this operation ends.

User response
If the SQL server messages do not resolve the problem, retry the operation. Contact your service representative if the error persists.

ACO5423E: The following string is too long: string

Explanation
A SQL error has occurred.

System action
Processing for this operation ends.

User response
If the SQL server messages do not resolve the problem, retry the operation. Contact your service representative if the error persists.
ACO5424E: Could not connect to SQL server; SQL server returned:

SQL message

Explanation
A SQL error has occurred.

System action
Processing for this operation ends.

User response
If the SQL server messages do not resolve the problem, retry the operation. Contact your service representative if the error persists.

ACO5425E: The SQL server is not running:

SQL message

Explanation
A SQL error has occurred.

System action
Processing for this operation ends.

User response
Start the SQL server and retry the operation.

ACO5426E: The SQL log on does not have the Sysadmin role:

SQL message

Explanation
An attempt was made to logon to the SQL server but the specified logon name does not have the Sysadmin role.

System action
Processing for this operation ends.

User response
Try the operation again and specify either a log on name with the Sysadmin role or change the specified log on name to have the Sysadmin role.
ACO5427E: The SQL server version is less than 7.0: SQL message

Explanation
An attempt was made to use Data Protection for SQL Server V2 with a SQL server version earlier than the version 7.0 level. This is not allowed.

System action
Processing for this operation ends.

User response
Use the Data Protection for SQL V1 client with SQL server earlier than the version 7.0 level, or retry the operation with a SQL server version 7.0 or later.

ACO5428E: The SQL server is not on the local machine: SQL message

Explanation
An attempt was made to use the application client specifying a SQL server that was not on the local machine.

System action
Processing for this operation ends.

User response
Retry the operation on the machine where the SQL server resides.

ACO5429E: Could not obtain an event from SQL server: SQL message

Explanation
A SQL error has occurred.

System action
Processing for this operation ends.

User response
If the SQL server messages do not resolve the problem, retry the operation. Contact your service representative if the error persists.
ACO5430E: The SQL Server Name is blank or NULL.

Explanation

In the query to obtain the SQL Server Name, the system returned a blank name. A valid SQL Server Name is necessary to continue the operation.

System action

Processing for the current operation ends.

User response

Check the SQL Server Name by using the "select @@servername" command from the SQL Query Analyzer. If that returns NULL, use the "sp_addserver" stored procedure to set the SQL Server Name to the correct value. After setting the SQL Server Name, retry the operation. Contact your service representative if the error persists.

ACO5431E: Multiple dbnames are not allowed.

Explanation

An invalid RESTORE command was issued. It is not valid to specify multiple database names in the <dbname> parameter list when using the /STANDBY, /RELOCATE, or /INTO options.

System action

Processing ends.

User response

Enter the command again with a valid value in the positional parameter or option.

ACO5432E: Equal numbers of the /RELOCATE and /TO options must be specified.

Explanation

Unequal numbers of the /RELOCATE and /TO options were specified on a RESTORE command.

System action

Processing ends.

User response

Re-enter the command specifying the same number of /RELOCATE and /TO options.
ACO5433E: Wildcards are not allowed as part of the following parameters/options:

Explanation
This message displays the positional parameters and/or options that were specified incorrectly.

System action
Processing ends.

User response
Re-enter the command specifying the correct parameters and/or options.

ACO5434E: The following options cannot be specified together:

Explanation
This message displays the conflicting command options that were entered.

System action
Processing ends.

User response
Re-enter the command specifying valid command options.

ACO5435E: This command requires one of the following options:

Explanation
This message displays the options that were missing from the command entered.

System action
Processing ends.

User response
Re-enter the command specifying one of the command options required by the command.

ACO5436E: A failure occurred on stripe number (stripe number), rc = return code

Explanation
A failure occurred on the numbered stripe.

System action
Processing ends.
User response

There should be other messages along with this one. Refer to the other messages to determine the problem.

ACO5450E: The specified number of stripes (number of stripes) is invalid. Processing will continue with the maximum number of stripes (maximum number of stripes).

Explanation

An invalid number of stripes was specified.

System action

Processing continues utilizing the allowed maximum number of stripes.

User response

None

ACO5451E: A failure occurred on vdev (vdev name), rc = return code

Explanation

A failure occurred on the named virtual device.

System action

Processing ends.

User response

There should be other messages displayed with this message. Refer to the other messages to determine the problem.

ACO5452E: Unable to delete temporary object: (filespace name) (high level qualifier) (low level qualifier)

Explanation

When a backup fails, the TDP agent attempts to delete all temporary backup data objects from the TSM server. This message indicates that the specified temporary backup data object could not be deleted from the TSM server. This error is usually caused by the loss of all TSM server sessions.

System action

Processing continues.

User response

None. A backup of the database should detect the temporary backup data object and delete it from the TSM server.
ACO5453E: The number of TSM sessions (number of TSM sessions) is invalid for the specified number of stripes (number of stripes).
Processing will continue with the number of TSM sessions (number of TSM sessions) as the number of stripes.

**Explanation**
An invalid number of TSM sessions was detected for the specified number of stripes. This message is caused by the circumvention of an internal error.

**System action**
Processing continues utilizing the number of TSM sessions as the number of stripes.

**User response**
Try the operation again. Contact your service representative if this error persists.

ACO5454E: The maximum number of objects allowed per TSM transaction (number of objects allowed per TSM transaction) is invalid for the specified number of stripes (number of stripes). Processing will continue with (new number of stripes) stripes.

**Explanation**
The maximum number of objects allowed per TSM transaction is invalid for the specified number of stripes for at least one of the TSM sessions. All TSM sessions must allow at least one more object per TSM transaction than the number of stripes.

**System action**
Processing continues utilizing the new number of stripes.

**User response**
Reduce the number of stripes. You can also update the TSM server to increase the maximum number of logical files that a client can send to the server in a single transaction (TxnGrpMax).

ACO5455E: The backup is corrupt and can not be restored.

**Explanation**
The backup being restored is corrupt because the data object or objects found do not correspond to the metadata.

**System action**
Processing ends.
**User response**

Try the operation again. Contact your service representative if the error persists.

---

**ACO5456W: The backup is corrupt and is not fully restorable.**
**Processing will continue.**

**Explanation**

The backup being restored is corrupt because the data object or objects found do not correspond to the metadata. Depending on the restore command and the backup type, a partial restore may be possible.

**System action**

Processing continues.

**User response**

Try the operation again. Contact your service representative if the error persists.

---

**ACO5457E: An unknown SQL API error has occurred.**

**Explanation**

A SQL API error has occurred but the associated error message could not be found. The SQL server activity log, SQL server error log, or Windows NT/2000 event log may contain more information.

**System action**

Processing ends.

**User response**

If the SQL server messages do not resolve the problem, try the operation again. Contact your service representative if the error persists.

---

**ACO5458W: The TSM Server 'backup delete' setting for node (TSM server NODENAME) is set to NO. It should be set to YES for proper operation. Processing will continue.**

**Explanation**

The TSM Server setting that allows TSM clients to delete their own backups is set to NO for the specified NODENAME. This value must be set to YES in order for cleanup operations to perform successfully. A NO value means that unusable residual data may be stored on the TSM Server.

**System action**

Processing continues.
Make sure the 'backup delete' setting for the specified NODENAME is set to YES on the TSM Server. Your TSM Server administrator can change this setting for your NODENAME. The setting can only be changed on the TSM Server.

ACO5500E: The MultiByteToWideChar() function failed.

Explanation
This is an internal error that indicates corrupted storage.

System action
Processing for this database ends.

User response
Try the operation again. Contact your service representative if this error persists.

ACO5501E: The Common Object Model (COM) library failed to initialize.

Explanation
The unsuccessful call was CoInitializeEx(NULL,COINIT_MULTITHREADED). OLE32.dll or another COM dll may be missing, down-level, or corrupted.

System action
Processing for this database ends.

User response
Verify your Windows NT (version 4 or later) installation is complete and try the operation again. Contact your service representative if this error persists.

ACO5550I: There are no backups matching the filespec directorypathfilename and the server name servername.

Explanation
There are no database backups on the Tivoli Storage Manager server for the specified server name.

System action
Processing ends.

User response
None
ACO5551I: There are no backups matching the criteria specified for server name `servername`.

**Explanation**

There are no database backups on the Tivoli Storage Manager server matching the query criteria for the specified server name.

**System action**

Processing ends.

**User response**

Specify a broader range of search criteria when issuing this query.

ACO5552I: No matches were found for the criteria specified.

**Explanation**

The SQL Server was searched for databases that matched the specified criteria.

**System action**

Processing ends.

**User response**

Check the specified search criteria (database name, group name, logical filename). Enter the command again.

ACO5616T: Database cannot be backed up because its name contains `\` or `:` character(s).

**Explanation**

Databases whose names contain directory or volume separator cannot be backed up or restored.

**System action**

Database was excluded from backup.

**User response**

Rename the database and restart backup.
ACO5617I: Database was excluded from backup because database name contains '\' or ':' character(s).

Explanation
Databases whose names contain directory or volume separator cannot be backed up or restored.

System action
Database was excluded from backup.

User response
Rename the database and restart backup.

ACO5629E: No Backups have been selected for restore.

Explanation
The Restore button was pressed but nothing was selected in the tree or list view.

System action
Processing stops.

User response
Make a selection in the tree or list view and press the Restore button again.

ACO5630E: Backups from multiple Server instances have been selected for restore.

Explanation
The Restore button was pressed and the user has selected backups from multiple server instances.

System action
Processing stops.

User response
Make a selection in the tree for backups belonging to the same server instance only
ACO5631E: Restoring full Legacy backups and full VSS backups in the same restore operation is not supported. Retry the restores in separate operations.

Explanation

At least one VSS backup object and one Legacy backup object were selected for a restore in the same operation. This is not supported.

System action

The restore operation is canceled.

User response

Retry the restores specifying the Legacy backups and VSS backups in separate operations.

ACO5715E: Error writing option_name preference to the configuration file.

Explanation

Could not write the specified preference to the configuration file.

System action

Preferences processing ends.

User response

Make sure you have a valid configuration file, then try to update the preference again.

ACO5716W: An error was encountered with Tivoli Storage Manager API initialization, rc = returncode. Examine the dsierror.log for more information or determine if the TSM API is installed properly.

Explanation

Errors were encountered during an attempt to run setup for the Tivoli Storage Manager API.

System action

Processing continues.

User response

Examine the dsierror.log file to determine the problem. If this file does not exist, the TSM API may not be installed properly. If the TSM API is not installed properly, install the TSM API and run the command again.
ACO5717E: Unable to log on to the SQL server.

**Explanation**

An error occurred while trying to log on to the SQL server.

**System action**

If running the client from the command line, the client ends. If running the client from the GUI, a prompt is displayed to enter the SQL user ID and password, or to choose Windows authentication.

**User response**

Make sure the SQL server is running.

ACO5718I: When the view is refreshed all selections will be lost and an attempt will be made to expand the new tree to the currently highlighted item. Do you want to continue?

**Explanation**

The refresh toolbar button or pulldown menu item has been selected.

**System action**

Processing continues.

**User response**

Select Yes to refresh the view or select No to leave the current view unchanged.

ACO5719I: There are currently no backups on TSM.

**Explanation**

The SQL server name expansion button was pressed on the Inactivate page.

**System action**

Processing stops.

**User response**

Either nothing was backed up to a TSM server or all active backups were inactivated.
ACO5720I: No databases have been selected for backup.

Explanation

The Backup button was pressed on the GUI but no databases were selected from
the tree or list.

System action

Processing stops.

User response

Select a database and press the Backup button again.

ACO5721I: No backups have been selected for restore.

Explanation

The restore button was pressed on the GUI but no backup objects were selected
from the tree or list.

System action

Processing stops.

User response

Select a backup object and press the Restore button again.

ACO5722I: No backups have been selected for inactivate.

Explanation

The Inactivate button was pressed on the GUI but no backup objects were selected
from the tree or list.

System action

Processing stops.

User response

Select a backup object and press the Inactivate button again.

ACO5723E: A named mark must be specified.

Explanation

The "Stop At Mark" or "Stop Before Mark" option was chosen but the named mark
was not specified.

System action

Processing stops.
User response
Enter a named mark or choose the "Stop At" option.

ACO5784E: A log must be selected to use point in time.

Explanation
A log must be selected before setting point in time parameters.

System action
Processing stops.

User response
Select at least one log for restore before specifying a point in time.

ACO5804I: Unable to get information. If data is backed up to tape check the "Wait for Tape Mounts for File Information" checkbox.

Explanation
Processing stops.

System action
None

User response
Try checking the box specified in the message.

ACO5805W: The SQL Server you are restoring from is different than the SQL server you are currently logged on to. Do you want to continue?

Explanation
Processing continues.

System action
None

User response
If you want to restore something from a different SQL server, press OK; otherwise press Cancel and log on to the other SQL server.
Accessibility features for Data Protection for SQL

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 Data Protection for SQL:

- 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 Information Center, and its related publications, are accessibility-enabled. The accessibility features of the information center are described at Accessibility and keyboard shortcuts in the information center.

Keyboard navigation

Standard shortcut and accelerator keys are used by the product and are documented by the operating system. Refer to the documentation provided by your operating system for more information.

Interface information

You can enlarge information on the product windows using facilities provided by the operating systems on which the product is run. For example, in a Microsoft Windows environment, you can lower the resolution of the screen to enlarge the font sizes of the text on the screen. Refer to the documentation provided by your operating system for more information.

IBM and accessibility

See the IBM Human Ability and Accessibility Center for more information about the commitment that IBM has to accessibility.
Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law:
INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:
IBM Corporation
Information Enabling Requests
Dept. M13
5600 Cottle Road
San Jose CA 95193-0001
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement or any equivalent agreement between us.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

This information is for planning purposes only. The information herein is subject to change before the products described become available.

If you are viewing this information softcopy, the photographs and color illustrations may not appear.
Trademarks

IBM, the IBM logo and the following terms are trademarks of the International Business Machines Corporation in the United States, other countries, or both:

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIX</td>
<td>OpenEdition</td>
</tr>
<tr>
<td>AS/400</td>
<td>OS/2</td>
</tr>
<tr>
<td>DB2</td>
<td>OS/390</td>
</tr>
<tr>
<td>DFS</td>
<td>OS/400</td>
</tr>
<tr>
<td>DFSMS/MVS</td>
<td>Passport Advantage</td>
</tr>
<tr>
<td>DFSMShsm</td>
<td>pSeries</td>
</tr>
<tr>
<td>DFSMSrmm</td>
<td>RACF</td>
</tr>
<tr>
<td>DPI</td>
<td>Rational</td>
</tr>
<tr>
<td>Enterprise Storage Server</td>
<td>Redbooks</td>
</tr>
<tr>
<td>ESCON</td>
<td>RS/6000</td>
</tr>
<tr>
<td>eServer</td>
<td>S/390</td>
</tr>
<tr>
<td>FICON</td>
<td>SANergy</td>
</tr>
<tr>
<td>FlashCopy</td>
<td>SecureWay</td>
</tr>
<tr>
<td>HACMP</td>
<td>StorageSmart</td>
</tr>
<tr>
<td>Informix</td>
<td>SystemView</td>
</tr>
<tr>
<td>iSeries</td>
<td>Tivoli</td>
</tr>
<tr>
<td>Lotus</td>
<td>Tivoli Enterprise Console</td>
</tr>
<tr>
<td>Lotus 1-2-3</td>
<td>Tivoli Management Enterprise</td>
</tr>
<tr>
<td>Lotus Approach</td>
<td>TotalStorage</td>
</tr>
<tr>
<td>Lotus Domino</td>
<td>TME</td>
</tr>
<tr>
<td>Lotus Notes</td>
<td>VTAM</td>
</tr>
<tr>
<td>Magstar</td>
<td>WebSphere</td>
</tr>
<tr>
<td>MVS</td>
<td>z/OS</td>
</tr>
<tr>
<td>NetView</td>
<td>zSeries</td>
</tr>
</tbody>
</table>

Intel®, Intel Inside® (logos), MMX and Pentium® are trademarks of Intel Corporation in the United States, other countries, or both.

Microsoft, Windows, Windows NT®, and the Windows logo are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Linux is a trademark of Linus Torvalds in the United States, other countries, or both.

Java™ and all Java-based trademarks and logos are trademarks or registered trademarks of Sun Microsystems, Inc. in the United States, other countries, or both.

Other company, product or service names may be trademarks or service marks of others.
Glossary

The terms in this glossary are defined as they pertain to the Tivoli Storage Manager library. If you do not find a term you are looking for, you can refer to the IBM Dictionary of Computing at URL: www.ibm.com/networking/nsg/nsgmain.htm

This glossary may include terms and definitions from:
- The Information Technology Vocabulary, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC2/SC1).

A

active policy set
The policy set within a policy domain that contains the most recently activated policy. This policy set is used by all client nodes assigned to the current policy domain. See policy set.

active version
The most recent backup copy of a file stored in Tivoli Storage Manager storage for a file that currently exists on a file server or workstation. An active version remains active and exempt from deletion until:
- Replaced by a new backup version.
- Tivoli Storage Manager detects, during an incremental backup, that the user has deleted the original file from a file server or workstation.

administrative client
A program that runs on a file server, workstation, or mainframe. This program lets administrators monitor and control Tivoli Storage Manager servers using Tivoli Storage Manager administrator commands. Contrast with backup-archive client.

administrator
A user who is registered to the server as an administrator. Administrators may possess one or more privilege classes. Administrators can use the administrative client to enter Tivoli Storage Manager server commands and queries according to their privileges.

application programming interface (API)
A set of functions that applications running on a client platform can call to store, query, and retrieve objects from Tivoli Storage Manager storage.

archive
A function permitting users to copy one or more files to a long-term storage device. Archive copies can:
- Accompany descriptive information
- Imply data compression software usage
- Be retrieved by archive date, file name, or description
Contrast with retrieve.

archive copy
A file or group of files residing in an archive storage pool in Tivoli Storage Manager storage.

archive copy group
A policy object containing attributes that control the generation, destination, and expiration of archived files. The archive copy group belongs to a management class.

archive retention grace period
The number of days Tivoli Storage Manager retains an archived copy when the server is unable to rebind the file to an appropriate management class.

authentication
The process of checking and authorizing a user's password before permitting user access to the Tivoli Storage Manager server. An administrator with system privilege can enable or disable authentication.

authorization rule
A specification permitting another user to
either restore or retrieve a user's files from Tivoli Storage Manager storage.

B

backup
A function permitting users to copy one or more files to a storage pool to protect against data loss. Contrast with restore.

backup-archive client
A program that runs on a file server, PC, or workstation and provides a means for Tivoli Storage Manager 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 files. A backup copy group belongs to a management class.

backup version
A backed up file, directory, or file space that resides in a backup storage pool in Tivoli Storage Manager storage. The active version is the most recent backup version. See active version and inactive version.

C

calendar
A program running on a file server, PC, workstation, or terminal that requests services of another program called the server. There are two types of Tivoli Storage Manager clients: administrative and backup-archive. See administrative client and backup-archive client.

calendar domain
The set of drives, file systems, or volumes selected by a user for processing during a backup or archive operation.

calendar node
A file server or workstation registered with the server on which the backup-archive client program is installed.

calendar options file
A file that a client can edit, containing a default set of processing options that identify the server, communication method, backup and archive options, space management options, and scheduling options.

calendar/server
A communications network architecture in which one or more programs (clients) request computing or data services from another program (the server).

closed registration
A registration process in which an Tivoli Storage Manager administrator must register workstations as client nodes with the server. Contrast with open registration.

command line interface
A type of user interface where commands are specified on the command line. Contrast with graphical user interface.

commit
To make changes permanent in the databases files. Changes made to the database files are not permanent until they are committed.

communication method
The method by which a client and server exchange information.

communication protocol
A set of defined interfaces that permits computers to communicate with each other.

compression
The process of saving storage space by eliminating empty fields or unnecessary data to shorten the length of the file. In Tivoli Storage Manager, compression can occur at a workstation before files are backed up or archived to server storage. On some types of tape drives, hardware compression can be used.

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

copy group
An Tivoli Storage Manager policy object that determines how Tivoli Storage Manager backs up or archives files. Copy groups belong to management classes. There are two copy groups:
- Backup copy group—determines how Tivoli Storage Manager backs up or archives files.
- Archive copy group—determines how Tivoli Storage Manager archives files.
default management class
A management class assigned to a policy set. This class is used to govern backed up or archived files when a user does not explicitly associate a file with a specific management class through the include-exclude list.

differential backup
A differential backup backs up only transaction logs, but does not clear 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 database back to the most recent state. This type of backup is also called a cumulative incremental backup.

domain
See policy domain or client domain.

dsm.opt file
See options file. Also called client options file.

e error log
A text file written on disk that contains Tivoli Storage Manager processing error messages. These errors are detected and saved by the Tivoli Storage Manager server.

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.

expiration
The process in which files are identified for deletion because their expiration date or retention period has passed. Backed up or archived files are marked for deletion based on the criteria defined in the backup or archive copy group.

file server
A dedicated computer and its peripheral storage devices connected to a local area network that stores both programs and files shared by users on the network.

file space
A logical space on the Tivoli Storage Manager server that contains a group of files. In Tivoli Storage Manager, users can restore, retrieve, or delete file spaces from Tivoli Storage Manager storage.

full backup
A full backup backs up the specified database as well as its associated transaction logs. After the database and logs are backed up, the log files are deleted.

generate password
Processing that 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 options file.

graphical user interface (GUI)
A type of user interface that takes advantage of a high-resolution monitor, includes a combination of graphics, the object-action paradigm, and the use of pointing devices, menu bars, overlapping windows, and icons. Contrast with command line interface.

GUI
Graphical user interface.

inactive version
A copy of a backup file in Tivoli Storage Manager storage that either is not the most recent version, or the corresponding original file was deleted from the client file system. Inactive backup versions are eligible for expiration according to the management class assigned to the file.

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 include-exclude list.

include-exclude list
A list of include and exclude 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. The include-exclude list is defined in one or more include-exclude files or in the client options file. The include-exclude list may contain entries from any or all of the following sources: the client options file, separate include-exclude files, or the Tivoli Storage Manager server. See options file.

**incremental backup**
An incremental backup only backs up the transaction logs and then clears them. Restoration of an Exchange Server database from an incremental backup requires a:
- 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.

**node**
See client node.

**node name**
A unique name used to identify a workstation, file server, or PC to the server.

**open registration**
A registration process in which users can register their own workstations or PCs as client nodes with the server. Contrast with closed registration.

**options file**
A file that contains processing options. Identifies Tivoli Storage Manager servers, specifies communication methods, defines scheduling options, selects backup, archive, restore, and retrieve options. Also called the client options file.

**policy domain**
A Tivoli Storage Manager policy object that lets Tivoli Storage Manager group client nodes by the policies that govern their files and by the administrator who manages the policies. The policy domain contains one or more policy sets.

**policy set**
A Tivoli Storage Manager policy object that specifies the management classes that are available to groups of users. More than one policy set can exist. However, only one policy set at a time can be active.

**progress indicator**
A control used to inform a user about the progress of a process.

**recovery log**
A log of updates that are about to be written to the databases. The log can be used to recover from system and media failures.

**registration**
The process of identifying a client node or administrator to the server by specifying a user ID, password, and contact information. For client nodes, a policy domain, compression status, and deletion privileges are also specified.
registry
A central database in Windows that contains information about hardware, applications, and operating system settings for each machine on the network. Provides security and control over system, security, and account settings.

restore
A function that permits users to copy a version of a backup file from the storage pool to a workstation or file server. The backup copy in the storage pool is not affected. Contrast with backup.

retention
The amount of time, in days, that inactive backed up or archived files are retained in the storage pool before they are deleted. The following copy group attributes define retention: retain extra versions, retain only version, retain version.

retrieve
A function permitting users to copy an archived file from the storage pool to the workstation or file server. The archive copy in the storage pool is not affected. Contrast with archive.

scheduling
A function permitting an administrator to schedule backup and archive operations from a central location. Operations can be scheduled on a periodic basis or on an explicit date.

scheduling mode
The type of scheduling operation for the client-server node. Tivoli Storage Manager supports two scheduling modes: client-polling and server-prompted.

scroll
Move through a list of items in a window by operating the scrollbars with the mouse cursor.

select
Choose an item from a list or group of items.

selective backup
A function permitting users to back up files from a client domain. These files are not excluded in the include-exclude list and meet the requirement for serialization in the backup copy group of the management class assigned to each file. Contrast with incremental backup.

server
A program running on a mainframe, workstation, or file server that provides shared services such as backup and archive to other various (often remote) programs (called clients).

server-prompted scheduling
A client-server communication technique where the server contacts the client node when tasks need to be done.

session
A period of time in which a user can communicate with a server to perform backup, archive, restore, or retrieve requests.

space management
The process of keeping sufficient free storage space available on a local file system for new data and making the most efficient and economical use of distributed storage resources.

storage pool
A named set of storage volumes used as the destination of backup, archive, or migrated copies.

T
TCP/IP

timeout
A time event involving:
• An event that happens at the end of a predetermined period of time that began at the happening of another specified event.
• A time interval allotted for certain operations to happen. For example, response to polling or addressing before system operation is interrupted and must be restarted.
• A terminal feature that logs off a user if an entry is not made within a specified period of time.

Tivoli Storage Manager
A client/server program that provides storage management to customers in a multivendor computer environment.

Transmission Control Protocol/Internet Protocol (TCP/IP)
A set of communication protocols that
support peer-to-peer connectivity functions for both local and wide area networks.

V

Veritas Cluster Server (VCS)
An application that provides high availability cluster management.

version
Storage management policy may allow back-level copies of backed up objects to be kept at the server whenever an object is newly backed up. The most recent backed up copy is called the "active" version. Earlier copies are "inactive" versions. The following backup copy group attributes define version criteria: versions data exists, and versions data deleted.

VSS Backup
A backup that 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.

VSS Fast Restore
A function that uses a VSS software provider to restore VSS Backups (Exchange database files and log files) that reside on local shadow volumes.

VSS Instant Restore
A volume-level hardware-assisted copy where target volumes (that contain the snapshot) are copied back to the original source volumes.

VSS offloaded backup
A backup that uses a VSS hardware provider (installed on an alternate machine) to move Exchange data to the Tivoli Storage Manager server. This type of backup shifts the backup load from the production machine to another machine.

VSS Restore
A function that uses a VSS software provider to restore VSS Backups (Exchange database files and log files) that reside on Tivoli Storage Manager server storage to their original location.

W

wildcard character
An asterisk (*) or question mark (?) character used to represent multiple (*) or single (?) characters when searching for various combinations of characters in alphanumeric and symbolic names.

workstation
A programmable high-level workstation (usually on a network) with its own processing hardware such as a high-performance personal computer. In a local area network, a personal computer that acts as a single user or client. A workstation can also be used as a server.
Index

A

access to databases, restricting 140
accessibility features for this product xxii, 281
active/inactive state
affected by full backup 90, 167
in restore operations 143
using the GUI 77
adjustkbtsmestimate parameter 92
adjustpercentestimate parameter 92
API, Tivoli Storage Manager 112
authorization mode, setting
using the CLI 96, 98, 116, 117, 147, 149, 182
using the GUI 67
automatic expiration policy, setting 55

B

backup command
and /backupdestination parameter 92
and /backupmethod parameter 93
and /logfile parameter 164
and /logprune parameter 165
and /offload parameter 95
and /quiet parameter 165
backup object types 14
differential 90, 138, 167
file 89, 137, 167
for query Data Protection for SQL 112
full 90, 138, 167
group 90, 138, 167
log 91, 138, 168
set 91, 138, 168
using the GUI 68
backup objects
compatibility with server 114
query of 112
backup operations
overview 10
using the GUI
backup databases tab 71, 73
backup groups/files tab 72
backup tree control 71
backup strategy
Tivoli Storage Manager versus local shadow volumes 42
VSS and Legacy together 20
VSS cluster 22, 43, 44
backupdestination parameter
and backup command 92
and restore command 139
and set command 178
backupmethod parameter
and backup command 93
and restore command 139
and set command 179
binary sort order 114
books
see publications xiv
buffering data
Data Protection for SQL
performance 29
for Data Protection for SQL 93, 113, 139, 179
for SQL server 96, 147, 182
for TDP 93, 114, 139
used with stripes 96, 147, 182
buffers parameter 93, 113, 139, 179
buffersize parameter 93, 114, 139
command-line parameters (continued)
/logfile
and backup 164
/logprune
and backup 165
/object
and delete backup 165
commands
query managedcapacity 130
commands, Data Protection for SQL
tdpsqlc changetsmassword 185
tdpsqlc help 174
tdpsqlc set 178
communication protocol
options file values 52
compatibility level
querying 111
compatibilityinfo
query of Data Protection for SQL 112
compatibilityinfo parameter 114
compressing data 17
options file value 53
cfgfile parameter 94, 114, 140, 168, 184, 186
and delete backup command 164
configuration
list of applications 41
options 52
overview 42
procedure 59
Off-loaded backups 61
SQL Server 60
Tivoli Storage Manager server 59
verify 62
configuration file, Data Protection for SQL
query TDP 112
setting values, CLI 94, 114, 140, 168, 178, 184, 186
setting values, GUI 63
configuration information, listing 114
consistency checker 18
conventions
typeface xxii
copy group 48
create index operation 89, 91
customer support xix

data and meta object values 47
data compression
options file value 53
time-saving strategy 17
data objects
in object naming 211
Data Protection for SQL
backup types 14
buffersize 93, 114, 139, 179
configuration file query 112
Data Protection for SQL (continued)
configuration file, setting
using the CLI 94, 114, 140, 168, 184, 186
using the GUI 63
configuration parameters 55
configuring options 52
features
new 1
functions overview
backup 10
restore 25
installation
hardware requirements 35
number of buffers 93, 113, 139, 179
online help xii
options file
automatic expiration policy 55
clustemode 23, 24
policy settings 19, 45
registering 49
running on MS Cluster Server 24
running on Veritas Cluster Server 25
silent installation 205
version query 112
data stripes
buffering 93, 113, 139, 179
Data Protection for SQL
performance 29
querying 112
recommendations 17
used with /sqlbuffers 96, 98, 147, 151, 182
using the CLI 98, 151, 183
data striping
buffering 93, 113, 139
database
options set 112
querying 112
restoring master 215
restoring to alternate 219
restoring using the GUI 74, 76
database information
using the GUI 69
database owner option, GUI 78
dateformat parameter 179
dbcc check options 18
dboonly parameter 140
delete backup
storage group
command line 163
delete backup command
and /configfile parameter 164
and /fromsqlserver parameter 164
and /object parameter 165
overview 162
syntax diagram 163
described 113
differential backup
overview 15
differential parameter
overview 15, 27
differential restore
overview 27
using the GUI 74, 76
differential versus log backup
strategy 16
difestimate parameter 179
disable VSS instant restore option, GUI 79
disaster recovery plan 18
disk-only storage pool
for query operations 47
domain 47
DS6000
considerations 14
DS8000
considerations 14
dsm.opt file
configuring 52
creating multiple 54
Tivoli Storage Manager
scheduler 191
dsmcutil.exe utility
using 52
dsm.opt file
configuring 52
enableclientencryptkey 54
creating multiple 54
Tivoli Storage Manager
scheduler 191
dsmcutil.exe utility
using 52
dsm.opt file
configuring 52
enableclientencryptkey 54
creating multiple 54
Tivoli Storage Manager
scheduler 191
dsmcutil.exe utility
using 52
dsm.opt file
configuring 52
enableclientencryptkey 54
creating multiple 54
Tivoli Storage Manager
scheduler 191
dsmcutil.exe utility
using 52
dsm.opt file
configuring 52
enableclientencryptkey 54
creating multiple 54
Tivoli Storage Manager
scheduler 191
dsmcutil.exe utility
using 52
dsm.opt file
configuring 52
enableclientencryptkey 54
creating multiple 54
Tivoli Storage Manager
scheduler 191
dsmcutil.exe utility
using 52
dsm.opt file
configuring 52
enableclientencryptkey 54
creating multiple 54
Tivoli Storage Manager
scheduler 191
dsmcutil.exe utility
using 52
dsm.opt file
configuring 52
enableclientencryptkey 54
creating multiple 54
Tivoli Storage Manager
scheduler 191
dsmcutil.exe utility
using 52
dsm.opt file
configuring 52
enableclientencryptkey 54
creating multiple 54
Tivoli Storage Manager
scheduler 191
dsmcutil.exe utility
using 52
dsm.opt file
configuring 52
enableclientencryptkey 54
creating multiple 54
Tivoli Storage Manager
scheduler 191
dsmcutil.exe utility
using 52
dsm.opt file
configuring 52
enableclientencryptkey 54
creating multiple 54
Tivoli Storage Manager
scheduler 191
dsmcutil.exe utility
using 52
dsm.opt file
configuring 52
enableclientencryptkey 54
creating multiple 54
Tivoli Storage Manager
scheduler 191
dsmcutil.exe utility
using 52
dsm.opt file
configuring 52
enableclientencryptkey 54
creating multiple 54
Tivoli Storage Manager
scheduler 191
dsmcutil.exe utility
using 52
dsm.opt file
configuring 52
enableclientencryptkey 54
creating multiple 54
Tivoli Storage Manager
scheduler 191
dsmcutil.exe utility
using 52
dsm.opt file
configuring 52
enableclientencryptkey 54
creating multiple 54
Tivoli Storage Manager
scheduler 191
dsmcutil.exe utility
using 52
dsm.opt file
configuring 52
enableclientencryptkey 54
creating multiple 54
Tivoli Storage Manager
scheduler 191
dsmcutil.exe utility
using 52
E
edit menu, GUI 63
education
see Tivoli technical training xvii
enabledclientencryptionkey
options file value 54
encryption 54
error log files xvi
excludedb parameter 94
expiration policy, setting 55
F
FAQ 197
file backup
overview 15
strategy 17
file parameter
described 89, 112, 137, 167
file restore
overview 27
using the GUI 74, 76
files
dsm.opt 52, 191
sqlfull.log 195
sqlsched.log 195
tdpxexec.cfg
and delete backup command 164
tdpxexec.log
and delete backup command 164
tdp.sql.cfg
setting 55
vsspolicy option 55
tdp.sql.log 200
fixes, obtaining xviii
Frequently asked questions 197
fromsqlserver parameter 114, 140, 168, 180
and delete backup command 164
full backup
overview 14
strategy 16
full parameter
described 90, 112, 138, 167
full plus differential plus log backup
strategy 16
full plus log backup strategy 16
full restore
overview 27
using the GUI 74, 76
G
generate password, setting
options file value 52
glossary 287
graphical user interface (GUI)
backup databases tab 71, 73
backup groups/files tab 72
backup list control 71
backup tree control 71
general selection rules 69
inactivating SQL databases 81
overview 63
restore databases tab 74
restore groups/files tab 76
restore list control 80
restore options 77, 78
restore tree control 80
restoring SQL databases 74, 76
shortcut menus
for inactivate 82
for restore 79
using the menu bar 63
using the toolbar 68
group backup
overview 15, 27
strategy 17
group parameter
described 90, 113, 138, 167
group restore
using the GUI 74, 76
H
hardware provider 13
hardware requirements 35
help
online xii
help command
described 174
help menu, GUI 68
I
inactivate operations
using the GUI 81
include/exclude
sample statements 211
syntax 56
indexes and tables
backing up 17
information centers, searching for
problem resolution xviii
installation
configuring options 52
hardware requirements 35
parameters, described (continued)
optional (continued)
/tsmnode 98, 118, 151, 170, 187
/tsmoptfile 99, 118, 152, 170, 187
/tsmpassword 99, 118, 152, 171
positional
backup object types 112
differential 90, 138, 167
file 89, 137, 167
force changes password command 185
for set command 178
full 90, 138, 167
group 90, 138, 167
log 91, 138, 168
set 91, 138, 168
partial parameter 143
partial restore option
overview 28
password, Tivoli Storage Manager changing
using the CLI 185
using the GUI 67
using dsmserv to manage 52
passwordaccess generate, setting 52
passwordchange cumbersome
using the CLI 150
using the GUI 78
point in time restore option, GUI 78
point-in-time restore
overview 27
policy set 47
policy settings
create group 48
Data Protection for SQL and Tivoli Storage Manager 19, 45
domain 47
management class 47
policy set 47
recommended 47
storage pool 49
problem determination xvi, 114
describing problems xx
determining business impact xx
submitting problems xxi
proxy nodes 50
publications
accessing online xiv
ordering xiv

Q
query managedcapacity command
overview 130
query operations
active/inactive state 77
preventing media mount 47
query SQL 111
query TDP 112
query TSM 112
sample output 119
query TSM options 110, 112
querying backup objects 80, 112
quiet parameter 144, 170
and delete backup command 165

R
recovery model
querying 112
recovery option, GUI 78
recovery parameter 144
refreshing GUI tree 66
register node command 18
registration 49
relocate option
overview 27
relocate option, GUI 79
relocate...to parameters 145
relocatedir option
overview 28
relocatedir parameter 145
remotedsmagentnode parameter
and set command 182
removable media 18, 55
recommendations 47
replace option, GUI 78
replace parameter 146
restore command
and /backupdestination parameter 139
and /backupmethod parameter 139
and /instantrestore parameter 140
restore operations
collocation for performance 18
master database 215
named marks 78, 150
of inactive objects 143
overview 25
point in time 78, 149, 150
time-saving strategy 16, 17
to a different SQL Server 18
to alternate machine 219
using the CLI 150
using the GUI 78
point in time restore option, GUI 78
point-in-time restore
overview 27
policy set 47
policy settings
copy group 48
Data Protection for SQL and Tivoli Storage Manager 19, 45
domain 47
management class 47
policy set 47
recommended 47
storage pool 49

S
sample output
query command 119
set command 184
SAN Volume Controller 14
considerations 14
SAN Volume Controller configurations 5
scheduler
example procedure 189
scheduling backups 24, 25
selection propagation rules, GUI for backup 69
server, SQL
querying 111
server, Tivoli Storage Manager
querying 112
using multiple 55
set backup
overview 15, 27
strategy 18
set command
and /backupdestination parameter 178
and /backupmethod parameter 179
and /localdsmanagentnode parameter 180
and /remotedsmagentnode parameter 182
positional parameters 178
sample output 184
set parameter
described 91, 138, 168
set restore
using the GUI 74, 76
setting configuration file values
using the GUI 63
setup.exe
used for silent installation 207
shortcut menus, GUI 79, 82
show active and inactive option, GUI 77
silent installation of Data Protection for SQL 205
simple recovery model 18
single-user mode 217
size of buffers
for SQL server 96, 147, 182
for TDP 93, 114, 139, 179
software provider 13
Software Support
contacting xix
describing problems xx
determining business impact xx
receiving weekly updates xviii
submitting problems xxi
sort order ID
querying 112
space allocated and used
querying 112
space-saving considerations 89, 90, 137, 138, 167
space, saving
strategy 16
SQL server
authentication mode 67
number of buffers 96, 147, 182
size of buffers 96, 147, 182
user id 67, 96, 116, 147, 182
SQL Server
running in clustered environment 24, 25
SQL Server 2000
clustering recommendation 17
SQL Server 2000 (continued)
  differential strategy 16
  named-marks restore 27
  partial restore 28, 78
  point in time restore 78
  query of 111
  simple recovery model 18
SQL services 24, 25
sqlauthentication parameter 96, 116, 147, 182
sqlbuffers parameter 96, 147
sqlbuffersize parameter 96, 147, 182
sqlcompression parameter 183
sqlfull.log 195
sqlpassword parameter 96, 116, 147
sqlsched.log 195
sqlserver parameter 97, 116, 148, 183
sqluser parameter 98, 117, 149
sqluserid parameter 182
standby parameter 149
standby server undo file option, GUI 79
stop (point in time) options, GUI 78
stopat parameter 149
stopatmark parameter 150
stopbeforemark parameter 150
storage group
  delete backup
    command line 163
  storage pool 49
    for meta objects 47
  stripes option, GUI 78
  stripes parameter 98, 151, 183
  stripes, data
    Data Protection for SQL
      performance 29
    time-saving strategy 17
    used with /sqlbuffers 96, 98, 147, 151, 182
    using the CLI 98, 151, 183
    using with tape media 17
  syntax diagrams
    delete backup command 163
  sysadmin fixed server role 132, 182
  system provider 13

tables and indexes
  backing up 17
tape media
  using with stripes 17
tdpevcc.cfg file
  and delete backup command 164
tdpevcc.log file
  and delete backup command 164
tdpsql.cfg file
  parameters
    setting 55
  tdpsql.cfg, setting values
    using the CLI 63, 94, 114, 140, 168, 184, 186
tempdb 18
  throughput, improving 93, 113, 114, 139, 140
  time-saving considerations 89, 90, 137, 138, 167
time, saving
  strategy 16, 17
timeformat parameter 183
Tivoli software information center xiv
Tivoli Storage FlashCopy Manager
  transitioning backups 201
Tivoli Storage Manager
  policy settings 19, 45
  Storage Manager API 112
  Storage Manager backup-archive client
    disaster recovery 18
    Tivoli Storage Manager scheduler 24, 25
    Tivoli Storage Manager server
      querying 112
      txngroupmax value for striping 17
    Tivoli technical training xvii
    toolbar, GUI 68
    training, Tivoli technical xvii
    transact-SQL command
      transaction log
        querying 112
      truncate log
        strategy 18
        truncate log on checkpoint option 18
        strategy 18
    tsmnode parameter 98, 118, 151, 170, 187
    tsmoptfile parameter 99, 118, 152, 170, 187
    tsmpassword parameter 99, 118, 152, 171
    txngroupmax option 17
  typeface conventions xxii
  types of backup objects
    using the GUI 68
  types parameter
    described 113
    syntax 110

U
  Unicode information
    querying 112
  update node command 18
  user mode, setting 217
  utilities menu, GUI 63, 67

V
  VCS environment
    supported 24
  view menu, GUI 63
  view options, GUI 77
  volume failure 17
  volume mount 55
  VSS
    and Legacy backups 20
    cluster 22, 43, 44
    DS and SAN Volume Controller
    storage 43
    hardware provider 13
    N-series and NetApp
    storage 43
    node names 50
    Off-loaded backup 14
    proxy nodes 50
    software provider 13
    system provider 13
    VSS Backup considerations 11
    VSS Fast Restore
      method 26
    VSS Instant Restore
      hardware requirements 35
      method 26
    VSS Provider 12
    VSS Requestor 12
    VSS Restore
      method 25
    VSS Service
      overview 12
    VSS Writer 12
    vspsolicy option 55

W
  wait for tape mounts options, GUI 78
  Windows authentication mode, setting
    using the CLI 96, 116, 147, 182
    using the GUI 67

X
  XIV Gen 2
    considerations 14