Data Protection for Microsoft SQL Server
Installation and User’s Guide

Version 5 Release 2
Note
Before using this information and the product it supports, be sure to read the general information under “Notices” on page 159.
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Summary of Changes

Changes for this publication are summarized below.

September 2003, Version 5 Release 2.1

This release contains the following changes:

• Support for Windows Server 2003. See “Software and operating system requirements” on page 15.

• Separately installed Language Packs are available. See “Language Packs” on page 17 for detailed information.

• Data Protection for SQL supports SQL Server 2000 (64-bit). See “Software and operating system requirements” on page 15 for more information.
Preface

IBM Tivoli Storage Manager for Databases Data Protection for Microsoft SQL Server is referred to as Data Protection for SQL throughout this book.

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

Tivoli Storage Manager is a separate 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 NT Server
- Windows 2000 Server
- Windows Server 2003

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

- SQL Server 7.0
- SQL Server 2000 (32-bit)
- SQL Server 2000 (64-bit)

Who should read this publication

The target audience for this publication are system installers, system users, 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 Program Interface

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

- Windows NT Server
- Windows 2000 Server
- Windows Server 2003

IBM Tivoli Storage Manager Web site

Technical support information and publications are available at the following address:

www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html

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 publications

Table 1. Related Tivoli Storage Manager publications

<table>
<thead>
<tr>
<th>Title</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM Tivoli Storage Manager for Windows Backup-Archive Client</td>
<td>GC32-0788</td>
</tr>
<tr>
<td>Installation and User’s Guide</td>
<td></td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for UNIX Backup-Archive Clients</td>
<td>GC32-0789</td>
</tr>
<tr>
<td>Installation and User’s Guide</td>
<td></td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Windows Administrator’s Guide</td>
<td>GC32-0782</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Windows Administrator’s Reference</td>
<td>GC32-0783</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for AIX Administrator’s Guide</td>
<td>GC32-0768</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for AIX Administrator’s Reference</td>
<td>GC32-0769</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Sun Solaris Administrator’s Guide</td>
<td>GC32-0778</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Sun Solaris Administrator’s Reference</td>
<td>GC32-0779</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager Messages</td>
<td>SC32-9090</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager Using the Application Program Interface</td>
<td>GC32-0793</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Windows Storage Agent User’s Guide</td>
<td>GC32-0785</td>
</tr>
</tbody>
</table>

The following IBM publications provide additional information.

Table 2. Related IBM publications

<table>
<thead>
<tr>
<th>Title</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using Tivoli Data Protection for Microsoft SQL Server (IBM Redbook)</td>
<td>SG24–6148</td>
</tr>
</tbody>
</table>

Contacting customer support

For support for this or any Tivoli product, you can contact IBM Tivoli Software Support in one of the following ways:

- Visit the IBM Tivoli Software Support Web site at:

- The IBM Support Solutions database contains a knowledge base of articles and information on issues related to backup and restore issues. Access this information at:

  Click the Hints and Tips, Solutions, and Support Flashes links in the Self help table for search information.

- Submit a problem management record (PMR) electronically at [IBMSERV/IBMLINK](http://IBMSERV/IBMLINK). You can access the IBMLINK from the IBM Web site at:

• Hearing-impaired customers should visit the TDD/TTY Voice Relay services and Accessibility Center Web site at
www.ibm.com/able/voicerelay.html

Customers in the United States can also call 1-800-IBM-SERV (1-800-426-7378).

International customers should consult the Web site for customer support telephone numbers.

You can also review the IBM Software Support Guide, which is available on our Web site at
techsupport.services.ibm.com/guides/handbook.html

When you contact IBM Software Support, be prepared to provide identification information for your company so that support personnel can readily assist you. Company identification information is needed to register for online support available on the Web site.

The support Web site offers extensive information, including a guide to support services (IBM Software Support Guide); frequently asked questions (FAQs); and documentation for all IBM Software products, including Release Notes, Redbooks, and white papers, defects (APARs), and solutions. The documentation for some product releases is available in both PDF and HTML formats. Translated documents are also available for some product releases.

All Tivoli publications are available for electronic download or order from the IBM Publications Center:
www.ibm.com/shop/publications/order/

We are very interested in hearing about your experience with Tivoli products and documentation. We also welcome your suggestions for improvements. If you have comments or suggestions about our documentation, please complete our customer feedback survey by selecting the Feedback link in the left navigation bar at the following Web site:
www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html

Please have the following information ready when you report a problem:
• The Tivoli Storage Manager Server version, release, modification, and service level number. You can get this information by entering the **query status** command at the Tivoli Storage Manager command line.
• The Tivoli Storage Manager client version, release, modification, and service level number. You can get this information by entering **dsmc** at the command line.
• The communication protocol (for example, TCP/IP), version, and release number you are using.
• The activity you were doing when the problem occurred, listing the steps you followed before the problem occurred.
• The exact text of any error messages.
Conventions used in this book

This document uses several typeface conventions for special terms and actions. These conventions have the following meaning:

Table 3. Typeface conventions

<table>
<thead>
<tr>
<th>Example</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>bold</strong></td>
<td>Commands, keywords, authorization roles, or other information that you must use appear in bold. Example: Log on to the server as root user.</td>
</tr>
<tr>
<td><em>italics</em></td>
<td>Values or variables that you must provide appear in italics. Emphasized words and phrases also appear in italics. Example: The node name of the production node and backup node must not be the same.</td>
</tr>
<tr>
<td><strong>bold italics</strong></td>
<td>Options and parameters appear in bold italics. Example: Specify the value for the compression option.</td>
</tr>
<tr>
<td>monospace</td>
<td>Directories, parameters, URLs, and output examples appear in monospace. Example: The product is installed in the C:\program files\tivoli\tsm\client\ba directory.</td>
</tr>
<tr>
<td>UPPER CASE</td>
<td>Environment variables associated with Tivoli Storage Manager, operating systems, or SQL Server appear in UPPER CASE. Example: Make sure the DSM_DIR environment variable is set correctly.</td>
</tr>
</tbody>
</table>

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).
### Syntax Diagram Description

#### Abbreviations:

Uppercase letters denote the shortest acceptable truncation. If an item appears entirely in uppercase letters, it cannot be truncated.

You can type the item in any combination of uppercase or lowercase letters.

In this example, you can enter KEYWO, KEYWORD, or KEYWOrd.

#### Symbols:

Enter these symbols exactly as they appear in the syntax diagram.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>*</td>
<td>Asterisk</td>
</tr>
<tr>
<td>{ }</td>
<td>Braces</td>
</tr>
<tr>
<td>:</td>
<td>Colon</td>
</tr>
<tr>
<td>,</td>
<td>Comma</td>
</tr>
<tr>
<td>=</td>
<td>Equal Sign</td>
</tr>
<tr>
<td>-</td>
<td>Hyphen</td>
</tr>
<tr>
<td>( )</td>
<td>Parentheses</td>
</tr>
<tr>
<td>.</td>
<td>Period</td>
</tr>
<tr>
<td>Space</td>
<td></td>
</tr>
</tbody>
</table>

#### Variables:

Italicized lowercase items (var_name) denote variables.

In this example, you can specify a var_name when you enter the KEYWORD command.

#### 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.
**Syntax Diagram Description** | **Example**
---|---
**Required Choices:**
When two or more items are in a stack and one of them is on the line, you *must* specify one item.

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

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

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

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

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

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

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

**Syntax Fragments:**
Some diagrams, because of their length, must fragment the syntax. The fragment name appears between vertical bars in the diagram. The expanded fragment appears between vertical bars in the diagram after a heading with the same fragment name.
### Tables

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Chapter 1. Introducing Data Protection for SQL

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) on Windows NT, Windows 2000, and Windows 2003. This chapter provides the following information about Data Protection for SQL:

- Version migration and coexistence
- Features
- Functions
- Security
- Performance
- Backup strategy considerations
- Online help
- Microsoft Cluster Server (MSCS) considerations

What’s new

The following features are new for Data Protection for SQL Version 5.2.1:

SQL Server 2000 (64-bit)
Data Protection for SQL supports SQL Server 2000 (64-bit) running on Windows Server 2003 (64-bit only). See “Software and operating system requirements” on page 15.

Windows Server 2003

Language Packs
Data Protection for SQL Version 5.2.1 provides language support in the form of separately installable Language Packs. If you want to use a language other than English, you must install the Language Pack for the desired language. English is automatically installed with the base code. See “Language Packs” on page 17 for detailed information.

Version migration and coexistence considerations

IMPORTANT!

Data Protection for SQL Version 5.2.1 utilizes the same backup naming conventions, file space names and placement, and meta contents as Data Protection for SQL Version 5.1.5. Like Version 5.1.5, Data Protection for SQL Version 5.2.1 is completely incompatible with Data Protection for SQL Version 1. You cannot query or restore backup objects created by Version 1 with Version 5.1.5 or Version 5.2.1. As a result, if you are restoring backup objects created by Version 1, you must retain Version 1 for as long as you retain those backup objects. Version 5.2.1 and Version 5.1.5 can coexist with Version 1. However, like Version 5.1.5, the Data Protection for SQL Version 5.2.1 interfaces are not compatible with the Version 1 interfaces. No migration tool is provided to help convert Version 1 command line scripts to Version 5.2.1 syntax. The Version 5.2.1 installation program will not replace any installed Version 1.
Data Protection for SQL Version 5.2.1 is compatible with Data Protection for SQL Version 2.2.x and Version 5.1.5.

## Data Protection for SQL features

Data Protection for SQL helps you protect and manage SQL Server data by making it easy to:

- Back up any SQL database to any Tivoli Storage Manager Server.
- Perform full and transaction log backups and restores of SQL databases.
- Perform backups with an expanded range of options such as differential, file, and group operations. See “SQL Server database backup” on page 3 for more detail.
- Perform operations from multiple SQL Server instances on the same machine as Data Protection for SQL (for SQL Server 2000).

**Note:** You can access only one SQL Server per execution of Data Protection for SQL from either the command line or GUI.

- Perform any backup using data striping in parallel threads using parallel sessions (up to 32 stripes for SQL Server 7.0 and 64 stripes for SQL Server 2000).
- Automate scheduled backups. See Appendix A, “Using the Tivoli Storage Manager scheduler”, on page 123.
- Perform expanded restore operations on backup objects such as relocating, restoring to named marks, and partially restoring full backups. See “SQL Server database restore” on page 4.
- Restore database backups to a different SQL Server.
  - Data Protection for SQL Version 5.2.1 can restore database backups that were performed on either 32-bit or 64-bit versions of SQL Server. Refer to Microsoft documentation on what combinations are supported by Microsoft.
- Retain with a 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.
- Inactivate all active objects, all objects of a particular backup type, or specific objects.
- Inactivate objects older than a specified number of days. See “SQL Server database inactivate” on page 6.
- Set automatic expiration of backup objects based on version limit and retention period. See “Tivoli Storage Manager policy requirements and recommendations” on page 24.
- Query any local SQL Server or any connected Tivoli Storage Manager Server for database, status, and configuration information. See “Data Protection for SQL query” on page 6.
- 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.
- Participate in MSCS and Windows 2000 fail-over clusters. See “Running Data Protection for SQL on a MSCS” on page 12.
- Apply fail-over clustering (for maintenance or restoring the master database) without unclustering.
- Obtain online context-sensitive, task, and concept help. See “Online Help” on page 12.
- View online documentation for Data Protection for SQL.
- Globalization Support
Data Protection for SQL functions

Data Protection for SQL provides these functions:
- Backup (page 3)
- Restore (page 4)
- Query (page 6)
- Inactivate (page 6)

SQL Server database backup

A backup creates a copy of all or part of a SQL database 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-DMO 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.

Notes:
1. Data Protection for SQL can compress SQL data before sending it to the Tivoli Storage Manager Server.
2. Meta Data:
   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 meta data. You will need this “meta” sub-object only when you need information about individual database file groups and files.

Data Protection for SQL offers an expanded range of backup types beyond full and log backups which allow greater flexibility when you do not want to backup an entire database, or when it is not practical to do so due to available backup time or performance requirements. Data Protection for SQL provides six types of backup:

Full database backup

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: You do not have to do a full backup to constitute the equivalent of a full backup. Backing up all the groups or files in a database as well as its log are recognized as a full backup by the SQL Server. A base backup may be a full, group, file, or set.

Differential backup

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

For more on backups using the GUI, see “Backing up SQL databases” on page 32, or for backups using the command line, see “Backup command” on page 48 or Chapter 6, “Command line parameters”, on page 89. See also “Data Protection for SQL backup strategy considerations” on page 8.

SQL Server database restore
A Data Protection for SQL 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 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-DMO 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.
Data Protection for SQL provides the same range of object types for restore as for backup:

**Full database restore**
Data Protection for SQL restores full database backup objects for specified SQL databases.

**Differential restore**
Data Protection for SQL restores only differential database backup objects for specified SQL databases. Restore time is reduced as only the latest differential backup is restored (after its associated full backup is restored).

**Log restore**
Data Protection for SQL restores only log backup objects for specified SQL databases.

**File restore**
Data Protection for SQL restores just the file backup objects needed from a full backup, file group backup, a file backup, or a set backup for specified SQL databases.

**Group restore**
Data Protection for SQL restores just the group backup objects needed from a full backup, file group backup, a file backup, or a set backup for specified SQL databases.

**Set restore**
Data Protection for SQL restores only set backup objects for specified SQL databases.

Depending on the backup strategy you choose, restoring a SQL database might involve restoring multiple backup objects from the Tivoli Storage Manager Server. See “Data Protection for SQL backup strategy considerations” on page 8.

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, or partial restores:

**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**
For SQL Server 2000, 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**
For SQL Server 2000, allows you to restore just enough of a database into a temporary location to copy a specific table to the active database.

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 for SQL Server 2000.
- Restore with no recovery until the last restore with recovery.
- Restore from any available backup version created by Data Protection for SQL 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).
• 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.

For more on restores using the GUI, see “Restoring SQL databases” on page 35, or for restores using the command line, see “Restore command” on page 65 or Chapter 6, “Command line parameters”, on page 89.

Data Protection for SQL query

A Data Protection for SQL query provides this information:
• Query the status of a local SQL Server.
• List the databases on a SQL Server.
• List the database objects in Tivoli Storage Manager storage.
• Provides information about Data Protection for SQL
• Provides connection information about the Tivoli Storage Manager Server.

Query SQL Server

A query of any SQL Server on the same node as Data Protection for SQL provides this information:
• Information about a specific SQL Server
• All databases on a SQL Server
• The configuration of any SQL Server database

Query Tivoli Storage Manager Server

You can query the Tivoli Storage Manager Server in order to list the following:
• A summary of backup types and quantities for a specific SQL database or all SQL databases
• All databases from a particular SQL Server backed up to the current Tivoli Storage Manager Server and node
• Connection information about the Tivoli Storage Manager Server.
• The saved configuration of any backup object
• All or active versions of all backups, a specific type of backup, or a specific backup
• Files or file groups

Query Data Protection for SQL

This lists the values in effect in the Data Protection for SQL configuration file.

For more on Data Protection for SQL query using the command line, see “Query command” on page 55 and “Query” on page 94. Using the Data Protection for SQL GUI, you can display information about servers, databases and backup objects through the list control pane of backup and restore windows. See “Backup list” on page 34 and “Restore list” on page 38 for details.

SQL Server database inactivate

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.

For more on inactivate using the GUI, see “Inactivating SQL databases” on page 39, or for inactivate using the command line, see “Inactivate command” on page 78 or Chapter 6, “Command line parameters”, on page 89.

Data Protection for SQL security

Data Protection for SQL requires that you have Windows administrator authority. This is needed for installation.

Tivoli Storage Manager security

Standard Tivoli Storage Manager security requirements apply to Data Protection for SQL. 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 Tivoli Storage Manager Server.

SQL Server logon information

Data Protection for SQL provides three options 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.

Data Protection for SQL 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.

Buffering:

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 parameter.
and /sqlbuffers parameters of the command line interface. The size of these buffers can be specified in the /buffersize and /sqlbuffersize parameters. For more information, refer to “Optional parameters” on page 103.

Data Striping:

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). For more on striping using the command line, see 119.

Notes:

1. Additional striping does not necessarily improve performance and may even decrease performance if system constraints involving real and paged memory, CPUs, 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, buffersize, 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.

Virtual Device Interface

Microsoft SQL Server 7.0 introduced VDI to back up and restore databases. Data Protection for SQL uses this interface as a high-performance alternative to named pipes interfaces used with earlier server versions.

LAN Free

Running Data Protection for SQL in a LAN free environment if you are equipped to do so avoids network constraints. Specify enablelanfree yes in the Data Protection for SQL options file. For information on setting up a LAN free environment, refer to the Tivoli publication IBM Tivoli Storage Manager for Windows Storage Agent User’s Guide.

Data Protection for SQL backup strategy considerations

Depending on your specific requirements regarding network traffic, backup window and acceptable restore times, you might choose to follow different backup strategies. Some commonly used strategies are described as follows:
**Full backup only**

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**

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.

**Note:** It is possible to do a point-in-time restore to restore a transaction log to a specified date and time.

**Differential backup**

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.

If restore time is more critical than backup time, SQL Server 7.0 differential backups may be desirable. However, differential backups with SQL 7.0 may take longer than log backups and longer than expected, even if the database has changed little since the last full backup. This is because SQL 7.0 processes every page of the database to determine if it should be included in the differential backup. SQL Server 2000, on the other hand, keeps track of which database pages have changed since the last full backup and does not have to process any pages that will not be included in the differential backup.

**Full plus differential plus log backup**

This strategy allows for a faster restore scenario by reducing the number of transaction logs that may need to be restored and applied. If, for example, a full 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).

**File or group backups**

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.

**Additional strategy considerations**

The following list provides additional information you should consider when choosing a backup strategy for Data Protection for SQL Version 5.2.1 with SQL Server.

**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. For SQL Server 7.0, the restore must use the same number of data stripes as the backup.
- 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. See 21 for more detail.

**Data striping:**

- 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 meta data (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. SQL Server 7.0 allows a maximum of 32 data stripes, and SQL Server 2000 allows a maximum of 64.

**Clustering:**

If you use Microsoft 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.

See “Running Data Protection for SQL on a MSCS” on page 12 for more information.

**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. For SQL Server 7.0, the primary file group must be accessible.

**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.
- If you want to restore a backup to a different SQL Server, in SQL Server 7.0, that server must have the same sort order, code page, and Unicode configuration as the original server; otherwise, SQL Server 7.0 will reject the restore and issue an error message.

**Various Recommendations:**
- 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 exploit 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 SQL Server 2000 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.

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

Data Protection for SQL provides online help you can view from the GUI. Select Help \(\rightarrow\) Contents in the GUI Toolbar to launch the online help. The online help includes information about:

- How to configure Data Protection for SQL.
- How to back up, restore, and activate a database.
- Conceptual information about Data Protection for SQL.

Data Protection for SQL also provides an online version of this Installation and User’s Guide in compiled HTML and PDF format. These files are installed in the Program Files\Tivoli\TSM\doc directory.

Globalization Support

Data Protection for SQL supports the following languages:

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

If you want to use a language other than English, you must install the Language Pack for the desired language. See the description of “Language Packs” on page 17 for detailed information.

Running Data Protection for SQL on a MSCS

Data Protection for SQL supports SQL Server running in a MSCS environment. For Windows 2000 and Windows 2003, Data Protection for SQL uses the Active Directory to support fail-over clustering. 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 book pertain to the virtual SQL Server name in an MSCS environment.
- You must install Data Protection for SQL on both 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 both nodes of the cluster to enable fail-over support. See Appendix A, “Using the Tivoli Storage Manager scheduler”, on page 123 for more information.
- The Tivoli Storage Manager Server 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 MSCS from the GUI, note the following:

- You must invoke 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\TSM\TDPSq1\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.
Chapter 2. Installing Data Protection for SQL

This chapter 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.

Program Temporary Fix (PTF)
This package does not contain a license component. It is created to install over a previously installed version of Data Protection for SQL.

Try and Buy
This package contains a license component that allows installation and use for sixty days.

Data Protection for SQL requirements

This section describes software, operating system, hardware, and communication information required to install Data Protection for SQL.

For compatibility and installation issues with Data Protection for SQL Version 1, see “Version migration and coexistence considerations” on page 1.

Software and operating system requirements

Data Protection for SQL supports the following software and operating system combinations:

<table>
<thead>
<tr>
<th>SQL Server</th>
<th>Operating System</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Server 7.0 (SP3+)</td>
<td>Yes</td>
</tr>
<tr>
<td>SQL Server 2000 (SP3+) (32-bit)</td>
<td>Yes</td>
</tr>
<tr>
<td>SQL Server 2000 (64-bit)</td>
<td>No</td>
</tr>
</tbody>
</table>

Notes:

1. Data Protection for SQL Versions 2.2, 5.1.5, and 5.2.1 (32-bit version) are not supported on Windows Server 2003 (64-bit).
2. If running SQL Server 7.0 and SQL Server 2000 on the same machine, a backup failure may occur. See Microsoft Knowledge Base article Q280759 at: http://support.microsoft.com/support/kb/articles/q280/7/59.asp
3. Tivoli Storage Manager Backup-Archive Client Version 5.1.5 (or later) is required to take advantage of Tivoli Storage Manager scheduling and disaster recovery planning.
Hardware requirements
The following hardware is required:
• Intel Itanium or Itanium II 64-bit processor
• 48 MB of RAM (96 MB or more is highly recommended)
• 12 MB of free disk space

Note: If you are installing using the electronically downloaded single .exe file, you may need several additional MB of free space in your Windows system and temporary directories. This self-starting, self-extracting file requires additional temporary working space.

See the readsql.txt file that is shipped on the product installation media for current information.

Communication
Data Protection for SQL must be installed on the same machine as the SQL Server. Data Protection for SQL uses the Tivoli Storage Manager API to communicate with the Tivoli Storage Manager Server. Data Protection for SQL also uses the the SQL-DMO interface and the SQL-VDI to communicate with the SQL Server.

Data Protection for SQL communicates with a Tivoli Storage Manager Server Version 5.1.0 (or later) running on any supported operating system. Data Protection for SQL supports the same communication methods as the installed level of the Tivoli Storage Manager API. Refer to the Tivoli Storage Manager Server being used to determine which protocols it supports. A Tivoli Storage Manager Server can reside on a different machine than Data Protection for SQL.

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

Installation considerations:
• 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.
• If Data Protection for SQL Version 1 exists on your system, Data Protection for SQL Version 5.2.1 installs to a different sub-directory than Version 1. If you are restoring backup objects created by Data Protection for SQL Version 1, you must retain Version 1 for as long as you retain those backup objects. Data Protection for SQL Version 5.2.1 will not overwrite the existing Data Protection for SQL option, configuration, and log files.

Follow these instructions to install Data Protection for SQL:
1. Insert the Data Protection for SQL CD-ROM into the CD-ROM drive.

Note: Windows may automatically start the InstallShield Wizard for you. If autorun is not enabled, perform the following steps:
 a. Select Run from the Start menu.
 b. Enter x:\setup where x is your CD-ROM drive letter.
 c. Click OK to start the installation program.

Alternatively, you can double-click setup.exe using the file manager.
2. Select a language for installation.
3. Follow the installation instructions displayed in the window prompts.
4. Click Finish to complete the installation.

**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 provided on the product CD-ROM. The Language Packs are executable files located in the TdPSql\win32\languages\xxx directory on the product CD-ROM. The xxx directory represents the three-letter country code associated with that language. 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:
  ```sql
  tdpsqlc set lang=fra
  ```
  See the description of the `language` parameter on page 99 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:
  ```plaintext
  English (United States)
  ```

When the installation is complete, you must:

- Register the client workstation with the Tivoli Storage Manager Server. See “Registering Data Protection for SQL with a Tivoli Storage Manager Server” on page 19 for detailed information.
- Configure Data Protection for SQL. See “Configuring the Data Protection for SQL options file” on page 20 for detailed information.

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**Installing Data Protection for SQL in a MSCS environment**

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

- Install Data Protection for SQL on the both nodes of your MSCS if you are installing Data Protection for SQL for a clustered SQL Server.
- If you installed Data Protection for SQL prior to converting to a MSCS 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:
  ```plaintext
  "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.
Chapter 3. Configuring Data Protection for SQL

Registering Data Protection for SQL with a Tivoli Storage Manager Server

The Data Protection for SQL node name must be registered with a Tivoli Storage Manager Server before requesting services. To make Tivoli Storage Manager administrative tasks easier, it is recommended that the node used for Data Protection for SQL be used only for SQL Server backups. Tivoli Storage Manager uses a node name and password comparable to the way Windows uses a user ID and password.

A Tivoli Storage Manager administrator must register Data Protection for SQL as a client node with the server. Your Tivoli Storage Manager administrator defines the following:

- Your Data Protection for SQL node name
- The initial password, if required
- The policy domain to which Data Protection for SQL belongs
- Tivoli Storage Manager schedules
- Whether more than one mount point (tape drive) can be allocated to your node
  This is done through the `maxnummp` parameter of the register node command. 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.
- Whether you can compress files before sending them to the server

**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.

Configuring the Tivoli Storage Manager Server

The Tivoli Storage Manager Server administrator must perform the following configuration commands when creating Tivoli Storage Manager nodes before the Tivoli Storage Manager Server can receive database backups from the SQL server:

- The `backdelete` parameter for `register` or `update node` must be `yes`. The default value is `no`.
- The `maxnummp` parameter for `register` or `update node` must 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. The default value is `1`. This value is the maximum number of mount points a node can have at one time. 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.
- The `collocate` parameter for `define stgpool` should be set to `filespace` to ensure that individual data stripes stay on separate removable volumes. The default value is `no`. Not doing so may require move operations to make the data for each stripe of a restore simultaneously accessible.
• The txngroupmax option in the Tivoli Storage Manager Server options file (usually dsmserv.opt) must be at least one more than the maximum number of stripes to be used for backup or restore operations regardless of media. The default value is 40.

• The management classes for Data Protection for SQL meta data should be identical to the corresponding management classes for database data except that the meta data management classes should not allow migration to removable media. If any Data Protection for SQL meta data is on removable media, queries may require media mounts, and backups or restores may require additional media mounts. For more on management classes, see “Tivoli Storage Manager policy requirements and recommendations” on page 24.

Note: When restoring large SQL databases, specifying a value of at least 10000 in the commtimeout option will help prevent a restore operation from ending prematurely. If the restore operation is performed in a LAN free environment, this value must be specified for the Storage Agent.

Configuring the Data Protection for SQL options file

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.

**servername**

This is the name of the Tivoli Storage Manager Server to which you backup SQL databases.

**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.

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:**

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).

**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 environment. This option *must* be specified for Data Protection for SQL to function properly on a MSCS.

**Enablelanfree**

A setting of *enablelanfree yes* allows Data Protection for SQL to run in a LAN free environment if you are equipped to do so.
Notes:
1. If you are running Data Protection for SQL on a MSCS, the options file on both nodes 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.

Setting automatic expiration

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 meta data is available for query without causing a volume mount. The meta data 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]\n\"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 quotes. 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.
  - Use lower case for the Data Protection for SQL constants: meta, data, full, diff, log, group, file, and set.

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

**SqlServerNames:**
SQL70, SQL2000

**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 C, “Advanced procedures”, on page 137.

**Tivoli Storage Manager policy requirements and recommendations**

The way in which Data Protection for SQL names the backup objects it stores on the Tivoli Storage Manager Server differs significantly from that used by Version 1. These changes were made in order to allow exploitation of the automatic policy-based expiration capabilities provided by the Tivoli Storage Manager Server. As a result, do not use the same management class parameters recommended for Data Protection for SQL Version 1. The following are the current recommended policy settings.

**Archive Copy Group**
Data Protection for SQL stores all objects as backup objects on Tivoli Storage Manager in backup storage pools, so an archive copy group is not required, although it can exist.

**Version Control Values**
Set the following copy group parameters as desired to define the version limit and retention periods for SQL database backup objects:
• versions data exists
• versions data deleted
• retain extra versions
• retain only version

**Copy Group Values**
You should accept default values for the following backup copy group parameters because they are not applicable to Data Protection for SQL:
• copy mode
• copy serialization
• copy frequency

**Log and Set Expiration Values**
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 retain only version parameter controls the expiration of log and set backups. There will never be more than one version of a log or set object.

**Considerations:**
• When selecting the retain only 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 may 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.
• Set backups are intended to be used in unusual one-of-a-kind situations. (For more detail, see file and group considerations regarding a Create Index operation in “Backup object types” on page 89.)

• 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.

Meta and Data Object Values
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.

For further details about binding backup objects to specific management classes, see “Setting automatic expiration” on page 22.

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.

Note: In many cases, you can also obtain the meta object information from SQL Server as recorded in its msdb database.

Data Striping Values
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.

Using Collocation
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.

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.

See your Tivoli Storage Manager administrator or see the appropriate Tivoli Storage Manager Administrator’s Guide for your server platform for more information on defining or updating policy domains and copy groups.
Chapter 4. Using the graphical user interface

This section describes the Data Protection for SQL GUI. The GUI performs the following:

Table 4. Data Protection for SQL GUI functions

<table>
<thead>
<tr>
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<th>Page</th>
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<td>Select functions from the Data Protection for SQL Menu and Toolbar.</td>
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<tr>
<td>Select and display information about a SQL database.</td>
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<td>Back up SQL databases.</td>
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<td>Inactivate SQL databases.</td>
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</tr>
</tbody>
</table>

Overview of the GUI

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. 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, or show server information for both the Tivoli Storage Manager Server and the SQL Server.

Help
- Obtain Data Protection for SQL help, online books, Tivoli Storage Manager Web access, and information about Data Protection for SQL.

Edit menu

Configuration
This 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 four tabs and their settings:

1. General
   - SQL Server
   - From SQL Server
   - SQL Authentication
– Integrated (default)
– SQL User ID

Note: If you select SQL User ID here and want to edit its default ID and password, you must do that through the Utilities menu login settings.

• Wait for Tape Mounts for Backup or Restore (default)
• Estimate % Change for Differential Backup (20 by default)

2. Performance
• TDP Buffers (3 by default)
• TDP Buffer Size (1024 by default)
• Stripes (1 by default)
• SQL Buffers (0 by default)
• SQL Buffer Size (1024 by default)

3. Logging
• Log File Name (tdpsql.log by default)
• Prune Old Entries (selected by default)
  – Keep Old Entries for Last (60 by default) Days
  – Prune Now

4. Regional
• Language (American English by default)
• Date Format (mm/dd/yyyy by default)
• Time Format (hh:mm:ss by default)
• Number Format (xxx,xxx.dd by default)

For specific considerations related to these configuration settings, refer to “Set” on page 97.

View menu

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 simply 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.

Utilities menu

Change TSM password

This dialog prompts you to enter the old password and the new password twice to verify it. See also “CHANGETSMPassword” on page 102.

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).

See also the SQL authentication parameters beginning on page 114.

**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

**Show MS SQL Server information**
This window displays the following SQL Server information:
• SQL Server Name
• Version
• Cluster
• Default Sort Order ID
• Default Code Page ID
• Unicode Local ID
• Unicode Comparison Style ID

**Help menu**

**Data Protection for SQL Help**
This dialog launches online help.

**Books Online**
This dialog launches Tivoli Storage Manager and Data Protection for SQL online books.

**TSM Web Access**
This dialog launches a Web browser to view Tivoli Storage Manager information online.

**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. Four buttons are available:
• Refresh tree
• Edit Data Protection for SQL configuration
• Access Tivoli Storage Manager Web links
• Online books

**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. In Version 1, the contents of the tree (SQL databases) did not change as the backup and restore tabs were selected. Therefore, the results of queries prompted by an initial restore tab
selection (or refresh) were only entered in the backup history list on the restore page. Thus, selections for restore were made only with this control list. In addition, deleted databases did not show up in the tree, necessitating the Direct Query button.

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.

Notes:
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’s expanded 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 5. GUI tab functions

<table>
<thead>
<tr>
<th>Tab Selection</th>
<th>Function</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Backup Databases</td>
<td>Perform full, differential, and log backups.</td>
<td>32</td>
</tr>
<tr>
<td>Backup Groups/Files</td>
<td>Perform group, file, and set backups.</td>
<td>33</td>
</tr>
<tr>
<td>Restore Databases</td>
<td>Restore from full, differential, and log backups.</td>
<td>35</td>
</tr>
<tr>
<td>Restore Groups/Files</td>
<td>Restore from full, group, file, set, and log backups.</td>
<td>35</td>
</tr>
<tr>
<td>Inactivate</td>
<td>Specifically select objects for inactivation apart from automated inactivation.</td>
<td>39</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 appears.
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 expanding it for operation.

Note: Except for the Backup Databases tree, you can continue expanding the tree view to display parts of databases such as groups and files. Restore trees will display all backup object types from backup operations. Databases in the Backup Databases tree do not have sub-directories to expand.

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.

Notes:

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.
Backing up SQL databases

Follow these steps to back up a SQL database:
1. Start the Data Protection for SQL GUI.

   **Note:** If you are running Data Protection for SQL on a MSCS, you must invoke the GUI with the /sqlserver parameter from the command line. For details, refer to page 13.

2. Click the Backup Databases or Backup Groups/Files tab control depending on the type of backup you want. For details, see “Backup Databases tab” and “Backup Groups/Files tab” on page 33.

3. From the tree view, select one or more SQL databases or parts of databases to back up.

Depending on which backup page you choose, the following section provides more detail to help you complete each type of backup operation.

**Backup Databases tab**

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.

For more information on these types of backup, refer to “Backup object types” on page 89.

If any of these is an appropriate type of backup, follow these steps:
1. From the Backup Databases tab, click the appropriate radio button in the Backup Type group box. Full is the default selection.
2. In Backup Options, select any of these options if appropriate:

   **Stripes**
   Allows you to specify the number of data stripes to use in a backup. The default value is 1. This option is always enabled. Refer to the /stripes parameter on page 119 for details.

   **Notes:**
   a. Be certain that the number of stripes is equal to or less than the number of SQL buffers, which is initially 0 in the configuration file.
   b. SQL Server 7.0 allows a maximum of 32 data stripes, and SQL Server 2000 allows a maximum of 64 data stripes.

   **Diff Est % Chg**
   For differential backups on any SQL server, this spin box allows you to estimate the percentage of database pages that have changed. The default is 20. Refer to the /diffestimate parameter on page 106 for details.

   **Truncate Log**
   For log backups, you can clear this check box only if you do not want the transaction log to be truncated after the backup. Refer to the /truncate parameter on page 120 for details.
Log Est % Chg
For log backups on a SQL Server 2000, this spin box allows you to estimate the percentage of database pages that have changed due to non-logged operations since the last log backup. The default is 0. Refer to the /logestimate parameter on page 108 for details.

3. 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.

Considerations:
- If you select for a log backup a database with the sql truncate log on checkpoint option enabled, Data Protection for SQL places an x in the selection icon in both the tree and list controls to indicate that you cannot perform this type of backup. This is because the log of a SQL database with this attribute cannot be backed up.
- The percentage estimates in the spin boxes are used in the backup process to reserve an initial block of storage on the Tivoli Storage Manager Server for the backup. If there is not enough storage on the server to satisfy the initial estimate, the backup will fail. If the backup is larger than estimated, Tivoli Storage Manager attempts to get more storage during the backup process. If there is not enough storage at that point, the backup will fail.

Backup Groups/Files tab
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.

For more information on these types of backup, refer to “Backup object types” on page 89.

If any of these is an appropriate type of backup, follow these steps:
1. From the Backup Groups/Files tab, click the appropriate radio button in the Backup Type group box. Group is the default selection.
2. In Backup Options, select the following option if appropriate:
   - Stripes Allows you to specify the number of data stripes to use in a backup. The default value is 1. This option is always enabled. Refer to the /stripes parameter on page 119 for details.

   Notes:
   a. Be certain that this corresponds to the value set for SQL buffers.
   b. SQL Server 7.0 allows a maximum of 32 data stripes, and SQL Server 2000 allows a maximum of 64 data stripes.

3. Click the Backup button to start the backup operation.

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

From the **Backup Groups/Files** tab, the following is displayed:

- For group objects when a database is highlighted (the database must first be expanded for this information to be available):
  - Group name
  - Space used
- For file objects when a group is highlighted:
  - Logical file name
  - Physical file name
  - Space used
Restoring SQL databases

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. Two windows support SQL restore operations:

**Restore Databases**
- Allows you to restore databases or parts of databases only from **full**, **differential**, and **log** backups.

**Restore Groups/Files**
- Allows you to restore databases or parts of databases from **group**, **file**, **set**, and **log** backups.

To perform restore operations from the GUI, follow these steps:

1. Start the Data Protection for SQL GUI.
   
   **Note:** If you are running Data Protection for SQL on a MSCS, you must invoke the GUI with the `/sqlserver` parameter. For details, refer to page 13.

2. Click the **Restore Databases** or **Restore Groups/Files** tab depending on the type of restore you want.
   
   The backup objects that display in the tree and list correspond to the tab you have selected.

3. From the tree, select the Tivoli Storage Manager Server that contains the backups, and then select one or more SQL databases or parts of databases to restore.

4. Select options in the **Restore Options** group box if appropriate. For details, see “Restore options” on page 36.

5. Click the **Restore** button to start the restore operation.

**Restore Databases tab**

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.
- Clearing a difffull \( D_0 \)...
  - selects the previous difffull \( D_1 \) if it exists.
  - if there is a following log \( L_0 \) selected, selects all logs between \( L_0 \) and \( D_1 \) if it exists, or selects all logs between \( L_0 \) and the associated full if \( D_1 \) does not exist.
- Clearing a log \( L_0 \)...
  - clears all logs following \( L_0 \).
**Restore Groups/Files tab**

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 $N_0$...
  - selects all log backups following $N_0$.
- Selecting a log backup $L_0$...
  - selects the prior non-log backup $N_0$.
  - selects all log backups following $N_0$.
- Clearing a non-log backup $N_0$...
  - clears all logs between $N_0$ and the next selected non-log backup $N_1$ if it exists, or clears all logs following $N_0$ if $N_1$ does not exist.
- Clearing a log backup $L_0$...
  - 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 $L_0$.

**Restore options**

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. The default value is 1. This option is always enabled. Refer to the `/stripes` parameter on page 119 for details.

**Notes:**

1. Be certain that this corresponds to the value set for SQL buffers.
2. SQL Server 7.0 allows a maximum of 32 data stripes, and SQL Server 2000 allows a maximum of 64 data stripes.

**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. See also 114.

**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. For further details, see 112.

**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. See also 106.
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 CD-ROMs. This information is retrieved from Tivoli Storage Manager when you press the plus (+) icon on the backup object to expand the tree. This option is selected by default. See also 110.

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. See also 107 and 110.

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

Partial restore
You can partially restore a full backup by selecting the check box. This creates a subset of the database, to which differential and log backups can be applied. This option is not selected by default.

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. See page 113 for information about the /relocate and /to parameters.

Note: Only SQL Server 2000 servers support partial restore. This check box is disabled for SQL Server 7.0 servers and always enabled for SQL Server 2000.

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

Note: The Stop at mark and Stop before mark options are enabled only with SQL Server 2000.

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. For more information about point in time restores, refer to /stopat on page 117.
**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).

The following characteristics are specific to the selected restore window:

- In the **Restore Databases** window, you cannot expand backup objects in the tree unless they are full backups and you have selected the **Partial** check box.
- 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.

**Note:** A differential backup object will appear as **difffull** in the tree and list controls.

**Restore list**

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

- Backup Object Type
- State (Active/Inactive)
- Backup Object Creation Date and Time
- Size
- Data Stripes
- Cluster
- Backup Object Identifier

From the **Restore Databases** tab, you can display the following additional information about a specific 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
- SQL Database Compatibility Level
- Default Code Page ID
- Unicode Locale ID
- Unicode Comparison Style
From the **Restore Groups/Files** tab, the following is displayed for group objects when a backup object is highlighted (once the backup has been expanded):

- Group Name
- Group Space Allocated
- Group Space Used
- Primary Group

From the **Restore Groups/Files** tab, the following is displayed for a file object when a group is highlighted:

- Logical File Name
- Physical File Name
- File Space Allocated
- File Space Used

**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.

**Note:** This Shortcut Menu is not available when the **Partial Restore** checkbox is selected.

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 this option to specify the new location of a SQL database file when restoring backups. Click **Relocate** to display a list box primed with a list of logical/physical file name pairs that can be edited. This menu item appears only in the **Restore Databases** window and is available for all backup types except for log backup objects on SQL Server 7.0.

**Standby Server Undo File**

Use this option to specify the undo file for a 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.

---

### Inactivating SQL databases

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.

See “SQL Server database inactivate” on page 6 for more information about inactivating database backups.

**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. Using the 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.

Overview of the command syntax

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 82.

Data Protection for SQL commands

Table 6 lists the primary command operations Data Protection for SQL provides. The description and syntax of each follows on the pages noted.

### Table 6. Data Protection for SQL 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>48</td>
</tr>
<tr>
<td>Query</td>
<td>Displays information about servers, databases, backup objects, and Data Protection for SQL configuration.</td>
<td>55</td>
</tr>
<tr>
<td>Restore</td>
<td>Restores all or part of one or more SQL databases to SQL server.</td>
<td>65</td>
</tr>
<tr>
<td>INACTIVate</td>
<td>Inactivates one or more active backup objects on the Tivoli Storage Manager Server.</td>
<td>78</td>
</tr>
<tr>
<td>Help</td>
<td>Displays the syntax of Data Protection for SQL commands.</td>
<td>82</td>
</tr>
<tr>
<td>Set</td>
<td>Changes the values of configuration parameters.</td>
<td>86</td>
</tr>
<tr>
<td>CHANGETSM</td>
<td>Changes the Tivoli Storage Manager password used by Data Protection for SQL.</td>
<td>88</td>
</tr>
</tbody>
</table>
Positional parameters

This section lists the available Data Protection for SQL command line positional parameters and refers you to detailed descriptions of each in this guide.

Backup object types

Table 7 lists the six types of backup objects available for Data Protection for SQL backup operations. Complete descriptions are found in Chapter 6 on the pages listed.

<table>
<thead>
<tr>
<th>Command</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full</td>
<td>Backs up a complete database plus part of the transaction log. This is the default for backup and restore.</td>
<td>91</td>
</tr>
<tr>
<td>Diffull</td>
<td>Backs up parts of a database changed since last full backup plus part of the transaction log.</td>
<td>91</td>
</tr>
<tr>
<td>Group</td>
<td>Backs up a single group of files in a database.</td>
<td>91</td>
</tr>
<tr>
<td>File</td>
<td>Backs up a single file in a database.</td>
<td>90</td>
</tr>
<tr>
<td>Set</td>
<td>Backs up multiple files and groups of files.</td>
<td>93</td>
</tr>
<tr>
<td>Log</td>
<td>Backs up the transaction log only, with or without truncation.</td>
<td>92</td>
</tr>
</tbody>
</table>

Query parameters

Query

The Data Protection for SQL query command requires any one of three positional parameters:

Query SQL
Displays information about a SQL server and databases.

Query TSM
Displays information about the Tivoli Storage Manager Server and backup objects.

Query TDP
Displays the current Data Protection for SQL configuration file.

For the command line syntax of query, see “Query command” on page 55. For a complete description of these positional parameters, see “Query” on page 94.
The following syntax diagram displays the Data Protection for SQL commands and positional parameters:

For the set command positional parameters, see “Set command” on page 86 and “Set” on page 97. For the changetsmpassword positional parameters, see “Changetsmpassword command” on page 88 and “CHANGETSMPassword” on page 102.

**Positional parameters by command**

Table 8 lists the available Data Protection for SQL positional parameters according to the command. If the option must be used with another positional parameter, that is indicated in the table. For complete descriptions of each, refer to “Positional parameters” on page 89.

*Table 8. Data Protection for SQL positional parameters by command*

<table>
<thead>
<tr>
<th>Positional Parameters</th>
<th>Backup</th>
<th>Restore</th>
<th>Query</th>
<th>Inactivate</th>
<th>Set</th>
<th>Change TSM password</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUFFers</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>BUFFER</td>
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<td>X</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>SIZE</td>
<td></td>
<td>X</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>DATEformat</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>dbname</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>with SQL or TSM</td>
</tr>
<tr>
<td>DiFFfull</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>with TSM</td>
</tr>
<tr>
<td>DIFFESTimate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>File</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>with TSM</td>
</tr>
<tr>
<td>FROMSQLSERVer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chapter 5. Using the command line interface 43
<table>
<thead>
<tr>
<th>Positional Parameters</th>
<th>Backup</th>
<th>Restore</th>
<th>Query</th>
<th>Inactivate</th>
<th>Set</th>
<th>Change TSM password</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full</td>
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<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
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<td>X</td>
<td></td>
<td>X</td>
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</tr>
<tr>
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<td>X</td>
<td></td>
<td>X</td>
<td></td>
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<tr>
<td>LOGFile</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
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<tr>
<td>LOGPrune</td>
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<td></td>
</tr>
<tr>
<td>MOUNTWait for data</td>
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<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>newpassword</td>
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<td></td>
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<td>NUMBER format</td>
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<tr>
<td>SQLBUFFER Size</td>
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<td></td>
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<tr>
<td>TIMEformat</td>
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<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

### Optional parameters

Table 9 on page 45 lists the available Data Protection for SQL optional parameters available by the command. If the option must be used with a positional parameter, that is indicated in the table. For a complete description of each of these parameters, refer to “Optional parameters” on page 103.
### Table 9. Data Protection for SQL optional parameters by command

<table>
<thead>
<tr>
<th>Optional Parameters</th>
<th>Backup</th>
<th>Restore</th>
<th>Query</th>
<th>Inactivate</th>
<th>Set</th>
<th>Change TSM password</th>
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</thead>
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<tr>
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<td></td>
<td>with TSM</td>
</tr>
<tr>
<td>/ALI</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>with TSM</td>
</tr>
<tr>
<td>/BUFFERS</td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td>with TSM</td>
</tr>
<tr>
<td>/BUFFERSIZE</td>
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<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>with SQL or TSM</td>
</tr>
<tr>
<td>info</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>/DBONLY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/DIFF ESTIMATE</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>with diff</td>
</tr>
<tr>
<td>FILEINFO</td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td>with TSM</td>
</tr>
<tr>
<td>/FILES</td>
<td></td>
<td>X</td>
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<td></td>
<td></td>
<td>with full, group, set</td>
</tr>
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<td>/FROMSQL SERVER</td>
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<td>X</td>
<td>X</td>
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<td></td>
</tr>
<tr>
<td>/GROUPS</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>with TSM</td>
</tr>
<tr>
<td>/INTO</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>/LOG ESTIMATE</td>
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<td>X</td>
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<td></td>
<td>with log</td>
</tr>
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<td>X</td>
<td></td>
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</tr>
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</tr>
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<td>X</td>
<td></td>
<td></td>
<td>with TSM</td>
</tr>
<tr>
<td>OBJECT</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>with TSM</td>
</tr>
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<td>OLDER_THAN</td>
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<td>PARTIAL</td>
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<td></td>
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<td></td>
<td>with full</td>
</tr>
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<td>QUIET</td>
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<td>RECOVERY</td>
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<td>with full, diff, log</td>
</tr>
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<td></td>
<td></td>
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<td>TO</td>
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</tbody>
</table>
### Table 9. Data Protection for SQL optional parameters by command (continued)

<table>
<thead>
<tr>
<th>Optional Parameters</th>
<th>Backup</th>
<th>Restore</th>
<th>Query</th>
<th>Inactivate</th>
<th>Set</th>
<th>Change TSM password</th>
</tr>
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<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>with all but log</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>/SQLAUTHentication</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>with SQL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/SQLBUFFers</td>
<td>X</td>
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<td>/SQLBUFFER Size</td>
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<td></td>
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<td>with SQL</td>
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<td>/SQLSERVER</td>
<td>X</td>
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<td>X</td>
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<td>/STANDby</td>
<td>X</td>
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</tr>
<tr>
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<td></td>
<td>with full, diff, log</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>/STOPAT</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
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<td>/STOPATMark</td>
<td>X</td>
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<tr>
<td>/AFTER</td>
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<td></td>
<td></td>
<td>with log</td>
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</tr>
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<td>/STOPBEFOREMark</td>
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<td>/AFTER</td>
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<td></td>
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<td>with log</td>
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</tr>
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<td>/STRIPes</td>
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<td></td>
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<td>/TRUNCate</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>with log</td>
<td></td>
<td></td>
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<td></td>
</tr>
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</tr>
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<td></td>
<td></td>
<td>with TSM</td>
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<td></td>
<td>with TSM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>/TSMPassword</td>
<td>X</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>with TSM</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 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:

```
> TDPSQLC—Backup dbname
```

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

Notes:
1. Data Protection for SQL commands are no longer followed by a colon (:) as in Data Protection for SQL Version 1.
2. For help in reading syntax diagrams, refer to “Reading syntax diagrams” on page x.

Notes
You can use Data Protection for SQL commands in command files when scheduling automatic backups of SQL databases. See Appendix A, “Using the Tivoli Storage Manager scheduler”, on page 123 for a discussion of using the Tivoli Storage Manager Central Scheduler with Data Protection for SQL.

A valid options file must exist in the directory where Data Protection for SQL is installed before running commands. If this file is missing, use the /tsmoptfile parameter. For information on how to modify Data Protection for SQL configuration, see “Configuring the Data Protection for SQL options file” on page 20.
Data Protection for SQL commands

The following describes each Data Protection for SQL command followed by a syntax diagram of the available parameters and sample output of the command. For a description of the parameters for each command, refer to Chapter 6, “Command line parameters”, on page 89.

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:

• 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.
• You cannot perform backups in SQL Server 7.0 when it is performing the following operations:
  – Creating or deleting SQL database files
  – Shrinking the SQL database or a file
  – Creating indexes, except for transaction log backups
  – Non-logged operations such as BULK COPY and SELECT INTO
• You cannot restore backups to SQL Server versions earlier than 7.0 if they were created for SQL Server 7.0 or later.

Syntax

```
TDPSQLC—Backup dbname

FULL

FILE= logicalfilename

DIFFerential A

Group= groupName

Log B

Set C
```

The syntax diagrams of the backup type options corresponding to the letters above (A,B,C) follow the Optional Parameters below.
For a description of the backup positional parameters, see “Backup object types” on page 89.

**Backup Optional Parameters:**

- `/BUFFers` = 3 [or cfg value]
  - `numbuffers`

- `/BUFFERSize` = 1024 [or cfg value]
  - `buffersizeinkb`

- `/CONFIGfile` = tdpsql.cfg
  - `configfilename`

- `/LOGfile` = tdpsql.log [or cfg value]
  - `logfilename`

- `/LOGPrune` = 60 [or cfg value]
  - `numdays`
  - `No`

- `/MOUNTWait` = Yes [or cfg value]
  - `No`

- `/Quiet`

- `/SQLAUTHentication` = INTEGRated [or cfg value]
  - `SQLuserid`

- `/SQLBUFFers` = 0 [or cfg value]
  - `numsqlbuffers`

- `/SQLBUFFERSize` = 1024 [or cfg value]
  - `sqlbuffersizeinkb`

- `/SQLPassword` = “”
  - `sqlpasswordname`
For a description of the backup options, see “Optional parameters” on page 103.

Backup output examples
Backup 1—Full

Backup 1 displays backing up two full databases, model and msdb, to Tivoli Storage Manager storage on a Tivoli Storage Manager Server. Two optional parameters, /sqlbuffers and /stripes, are included.
Command:
```
tdpsqlc back model,msdb full /sqlbuff=2 /strip=2
```

Output:
```
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

Starting SQL database backup...

Beginning full backup for database model, 1 of 2.
Full: 0  Read: 1218832  Written: 1218832  Rate: 322.48 Kb/Sec
Backup of model completed successfully.

Beginning full backup for database msdb, 2 of 2.
Full: 0  Read: 8250640  Written: 8250640  Rate: 2,463.24 Kb/Sec
Backup of msdb completed successfully.

Total SQL backups selected: 2
Total SQL backups attempted: 2
Total SQL backups completed: 2
Total SQL backups excluded: 0
Total SQL backups inactivated: 0

Throughput rate: 1,327.52 Kb/Sec
Total bytes transferred: 9,469,472
Elapsed processing time: 6.97 Secs
```

Backup 2–Full

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

Command:
```
tdpsqlc back test2 full /q /sqlauth=sql
```

Output:
```
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

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 3–Differential

In Backup 3, a differential backup follows the previous full backup of test2. An estimate of the changed portion of test2 is included.

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

Output:
```
IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

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 "difffull" in CLI output and in the GUI tree and list.

Backup 4–Log

In Backup 4, the previous full backups of test2 and model are followed by log backups of each. The default to truncate the logs is overridden.

Command:

`tdpsqlc back test2,model log /trunc=no`

Output:

IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

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

Backup 5–Group

Backup 5 displays backing up a file group called group1 belonging to the test2 database.

Command:

`tdpsqlc back test2 group=group1`

Output:

IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.
Starting SQL database backup...

Beginning group backup for database test2, 1 of 1.
Full: 0  Read: 866888  Written: 866888  Rate: 513.07 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: 512.76 Kb/Sec
Total bytes transferred: 866,888
Elapsed processing time: 1.65 Secs

Backup 6–File

Backup 6 displays backing up all files belonging to test2 using the wildcard (*). This consists of three files within two groups within one database.

Command:
```
tdpsqlc back test2 file=*```

Output:

IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

Starting SQL database backup...

Beginning file backup for database test2, 1 of 3.
Full: 0  Read: 669832  Written: 669832  Rate: 569.31 Kb/Sec

Backup of test2 completed successfully.

Beginning file backup for database test2, 2 of 3.
Full: 0  Read: 669832  Written: 669832  Rate: 388.90 Kb/Sec

Backup of test2 completed successfully.

Beginning file backup for database test2, 3 of 3.
Full: 0  Read: 13958280  Written: 13958280  Rate: 2,911.39 Kb/Sec

Backup of test2 completed successfully.

Total SQL backups selected: 3
Total SQL backups attempted: 3
Total SQL backups completed: 3
Total SQL backups excluded: 0
Throughput rate: 1,987.15 Kb/Sec
Total bytes transferred: 15,297,944
Elapsed processing time: 7.52 Secs

Backup 7–Set

Backup 7 displays backing up 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 back test2 s /groups=primary /files=test2_2data, test2_3data```
Output:

IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. 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: 3,402.56 Kb/Sec
Total bytes transferred: 14,706,896
Elapsed processing time: 4.22 Secs
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:

  \[TDPcommandstatement | more\]

Syntax

The syntax diagram of the Tivoli Storage Manager options corresponding to the letter above (A) follows the Optional Parameters below.

For a description of the query positional parameters, see “Query” on page 94.

Query Optional Parameters:
For a description of the query options, see “Optional parameters” on page 103.
Query output samples
Query 1–SQL Server

Query 1 queries the SQL server *mutalisk*, and includes compatibility information.

Command:
```
tdpsqlc query sql /compat
```

Output:

```
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

SQL Server Information

----------------------
SQL Server Name ................. MUTALISK
SQL Server Version ............... 7.0
Default Sort Order ID ............ 52
Default Code Page ID .............. 1252
Unicode Locale ID ................ 1033
Unicode Comparison Style ID ...... 196609
Cluster .......................... No
```

Query 2–SQL Database

Query 2 queries a particular SQL server database, *test2* and includes compatibility information on SQL Server 7.0.

Command:
```
tdpsqlc query sql test2 /compat
```

Output:

```
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

SQL Server Information

----------------------
SQL Server Name ................. MUTALISK
SQL Server Version ............... 7.0
Default Sort Order ID ............ 52
Default Code Page ID .............. 1252
Unicode Locale ID ................ 1033
Unicode Comparison Style ID ...... 196609
Cluster .......................... No

SQL Database Information

------------------------
SQL Database Name .............. test2
SQL Database Data Space Allocated .... 104,857,600
SQL Database Data Space Used ........ 14,680,064
SQL Database Log Space Allocated ...... 104,857,600
SQL Database Log Space Used .......... 14,192,640
SQL Database Compatibility level ...... 70
SQL Database Options ..............
```
Query 3–TDP

Query 3 queries Data Protection for SQL for configuration file information.

**Command:**
```
tdpsqlc query tdp
```

**Output:**
```
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

TDP for Microsoft SQL Server configuration settings
---------------------------------------------------

BUFFers ................................... 3
BUFFERSize ................................ 1024
DATEformat ................................ 1
DIFFESTimate .............................. 20
FROMSQLserver ............................
LANGuage ................................ AMENG
LOGFile ................................... tdpsql.log
LOGPrune .................................. 60
MOUNTWaitfordata .......................... Yes
NUMBERformat .............................. 1
SQLAUTHentication ......................... INTEGRated
SQLBUFFers ................................ 0
SQLBUFFERSize ............................. 1024
SQLSERVER .................................
STRU pes ................................... 1
TIMEformat ................................ 1
```

Query 4–TSM Types

Query 4 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 * types /all
```

**Output:**
```
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

Backup Object Information
-------------------------

<table>
<thead>
<tr>
<th>SQL Database Name</th>
<th>SQL Server Name</th>
<th>Number of Full Active Backup Objects</th>
<th>Number of Full Inactive Backup Objects</th>
<th>Number of Log Active Backup Objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>model</td>
<td>MUTALISK</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>msdb</td>
<td>MUTALISK</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>test1</td>
<td>MUTALISK</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>
```
Query 5—Tivoli Storage Manager Database

Query 5 queries the Tivoli Storage Manager Server for a particular database, test2, and displays all of its active backup objects by default.

Command:
`tdpsqlc query tsm test2`

Output:

IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

Backup Object Information
-------------------------

SQL Database Name ......................... test2
SQL Server Name .......................... MUTALISK
Number of Full Active Backup Objects .. 1
Number of Full Inactive Backup Objects .. 1
Number of Difffull Active Backup Objects .. 1
Number of Difffull Inactive Backup Objects .. 1
Number of Log Active Backup Objects .. 4
Number of Log Inactive Backup Objects .. 3
Number of Group Active Backup Objects .. 1
Number of Group Inactive Backup Objects .. 1
Number of File Active Backup Objects .. 1
Number of File Inactive Backup Objects .. 3
Number of Set Active Backup Objects .. 1
Number of Set Inactive Backup Objects .. 2

SQL Server Name .......................... MUTALISK
SQL Database Name ......................... test2
Backup Object Type ........................ Full
Backup Object State ....................... Active
Backup Creation Date / Time .............. 06/27/2003 15:25:43
Backup Size .............................. 15,236,608
Database Object Name ..................... 20030627152543\0000015F
Number of stripes in backup object ....... 1

SQL Server Name .......................... MUTALISK
SQL Database Name ......................... test2
Backup Object Type ........................ Difffull
Backup Object State ....................... Active
Backup Creation Date / Time .............. 06/27/2003 15:26:19
Backup Size .............................. 4,682,240
Database Object Name ..................... 20030627152619\0000015F
Number of stripes in backup object ....... 1

SQL Server Name .......................... MUTALISK
SQL Database Name ......................... test2
Backup Object Type ........................ Log
Backup Object State ....................... Active
Backup Creation Date / Time .............. 06/27/2003 15:26:44
Backup Size .............................. 86,528
Database Object Name ..................... 20030627152644\0000015F
Number of stripes in backup object ....... 1

SQL Server Name .......................... MUTALISK
SQL Database Name ......................... test2
Backup Object Type ........................ Group

<table>
<thead>
<tr>
<th>SQL Server Name</th>
<th>MUTALISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Database Name</td>
<td>test2</td>
</tr>
<tr>
<td>Backup Object Type</td>
<td>Log</td>
</tr>
<tr>
<td>Backup Object State</td>
<td>Active</td>
</tr>
<tr>
<td>Backup Creation Date / Time</td>
<td>06/27/2003 15:27:50</td>
</tr>
<tr>
<td>Backup Size</td>
<td>865,792</td>
</tr>
<tr>
<td>Database Object Name</td>
<td>20030627152750\0000015F</td>
</tr>
<tr>
<td>Number of stripes in backup object</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SQL Server Name</th>
<th>MUTALISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Database Name</td>
<td>test2</td>
</tr>
<tr>
<td>Backup Object Type</td>
<td>Log</td>
</tr>
<tr>
<td>Backup Object State</td>
<td>Active</td>
</tr>
<tr>
<td>Backup Creation Date / Time</td>
<td>06/27/2003 15:27:51</td>
</tr>
<tr>
<td>Backup Size</td>
<td>86,528</td>
</tr>
<tr>
<td>Database Object Name</td>
<td>20030627152751\0000015F</td>
</tr>
<tr>
<td>Number of stripes in backup object</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SQL Server Name</th>
<th>MUTALISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Database Name</td>
<td>test2</td>
</tr>
<tr>
<td>Backup Object Type</td>
<td>File</td>
</tr>
<tr>
<td>SQL File Logical Name</td>
<td>test2_2data</td>
</tr>
<tr>
<td>Backup Object State</td>
<td>Active</td>
</tr>
<tr>
<td>Backup Creation Date / Time</td>
<td>06/27/2003 15:29:31</td>
</tr>
<tr>
<td>Backup Size</td>
<td>669,184</td>
</tr>
<tr>
<td>Database Object Name</td>
<td>20030627152931\0000015F</td>
</tr>
<tr>
<td>Number of stripes in backup object</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SQL Server Name</th>
<th>MUTALISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Database Name</td>
<td>test2</td>
</tr>
<tr>
<td>Backup Object Type</td>
<td>Log</td>
</tr>
<tr>
<td>Backup Object State</td>
<td>Active</td>
</tr>
<tr>
<td>Backup Creation Date / Time</td>
<td>06/27/2003 15:29:35</td>
</tr>
<tr>
<td>Backup Size</td>
<td>86,528</td>
</tr>
<tr>
<td>Database Object Name</td>
<td>20030627152935\0000015F</td>
</tr>
<tr>
<td>Number of stripes in backup object</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SQL Server Name</th>
<th>MUTALISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Database Name</td>
<td>test2</td>
</tr>
<tr>
<td>Backup Object Type</td>
<td>Set</td>
</tr>
<tr>
<td>Backup Object State</td>
<td>Active</td>
</tr>
<tr>
<td>Backup Creation Date / Time</td>
<td>06/27/2003 15:30:02</td>
</tr>
<tr>
<td>Backup Size</td>
<td>14,326,272</td>
</tr>
<tr>
<td>Database Object Name</td>
<td>20030627153002\0000015F</td>
</tr>
<tr>
<td>Number of stripes in backup object</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SQL Server Name</th>
<th>MUTALISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>SQL Database Name</td>
<td>test2</td>
</tr>
<tr>
<td>Backup Object Type</td>
<td>Log</td>
</tr>
<tr>
<td>Backup Object State</td>
<td>Active</td>
</tr>
<tr>
<td>Backup Creation Date / Time</td>
<td>06/27/2003 15:30:38</td>
</tr>
<tr>
<td>Backup Size</td>
<td>86,528</td>
</tr>
<tr>
<td>Database Object Name</td>
<td>20030627153038\0000015F</td>
</tr>
<tr>
<td>Number of stripes in backup object</td>
<td>1</td>
</tr>
</tbody>
</table>
Query 6–TSM Database

Query 6 queries the Tivoli Storage Manager Server for information on database Test1 including compatibility information.

Note: The information displayed is for a backup object created from SQL Server 2000. Compatibility information displayed for a backup object created on SQL Server 7 will contain additional information.

Command:

tdpsqlc q tsm Test1 full /compat

Output:

IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

Backup Object Information
-------------------------
SQL Server Name .................. RBSTEST11\RBSTEST11_2000
SQL Database Name ................. Test1
Backup Object Type ................. Full
Backup Object State ............... Active
Backup Creation Date / Time ........ 06/27/2003 11:15:44
Backup Size ....................... 89,607,680
Database Object Name .............. 20030627111544\00000000
Number of stripes in backup object .... 1
SQL Server Version ................. 8.0.194
Cluster .......................... No
TDP Version ........................ 2.2.0.0
SQL Database Compatibility level .... 80
SQL Database Data Space Allocated .... 93,585,408
SQL Database Data Space Used ....... 90,439,680
SQL Database Log Space Allocated .. 104,595,456
SQL Database Log Space Used .......... 14,225,408
SQL Database Options ............... Torn page detection

Query 7–TSM Database

Query 7 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 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

Backup Object Information
-------------------------
SQL Server Name .................. RBSTEST11\RBSTEST11_2000
SQL Database Name ................. Test1
Backup Object Type ................. Full
Backup Object State ............... Inactive
Backup Creation Date / Time ........ 06/27/2003 11:15:44
Backup Size .............................. 89,607,680
Database Object Name ..................... 20030627111544\000000700
Number of stripes in backup object ...... 1

SQL Group Logical Name ................... Group1
SQL Group Space Allocated ................. 90,439,680
SQL Group Space Used ...................... 87,293,952
SQL File Logical Name ..................... File1Group1
SQL File Physical Name .................... C:\Program Files\Microsoft SQL Server\MSSQL$RBSTEST11_2003\data\File1Group1_Data.NDF
SQL File Space Allocated .................. 47,382,528
SQL File Space Used ....................... 44,236,800
SQL File Logical Name ..................... File2Group1
SQL File Physical Name .................... C:\Program Files\Microsoft SQL Server\MSSQL$RBSTEST11_2003\data\File2Group1_Data.NDF
SQL File Space Allocated .................. 43,057,152
SQL File Space Used ....................... 43,057,152

SQL Group Logical Name ................... Group2
SQL Group Space Allocated ................. 2,097,152
SQL Group Space Used ...................... 2,097,152
SQL File Logical Name ..................... File1Group2
SQL File Physical Name .................... C:\Program Files\Microsoft SQL Server\MSSQL$RBSTEST11_2003\data\File1Group2_Data.NDF
SQL File Space Allocated .................. 1,048,576
SQL File Space Used ....................... 1,048,576
SQL File Logical Name ..................... File2Group2
SQL File Physical Name .................... C:\Program Files\Microsoft SQL Server\MSSQL$RBSTEST11_2003\data\File2Group2_Data.NDF
SQL File Space Allocated .................. 1,048,576
SQL File Space Used ....................... 1,048,576

SQL Group Logical Name ................... PRIMARY
SQL Group Space Allocated ................. 1,048,576
SQL Group Space Used ...................... 1,048,576
SQL File Logical Name ..................... Test1_Data
SQL File Physical Name .................... C:\Program Files\Microsoft SQL Server\MSSQL$RBSTEST11_2003\data\Test1_Data.MDF
SQL File Space Allocated .................. 1,048,576
SQL File Space Used ....................... 1,048,576

SQL Group Logical Name ................... TRANSACTION LOG
SQL Group Space Allocated ................. 104,595,456
SQL Group Space Used ...................... 14,225,408
SQL File Logical Name ..................... Test1_Log
SQL File Physical Name .................... C:\Program Files\Microsoft SQL Server\MSSQL$RBSTEST11_2003\data\Test1_Log.LDF
SQL File Space Allocated .................. 104,595,456

SQL Server Name ......................... RBSTEST11\RBSTEST11_2000
SQL Database Name ....................... Test1
Backup Object Type ....................... Full
Backup Object State ....................... Active
Backup Creation Date / Time .............. 06/27/2003 11:32:59
Backup Size .............................. 89,607,680
Database Object Name .................... 20030627113259\000000700
Number of stripes in backup object ...... 1

SQL Group Logical Name ................... Group1
SQL Group Space Allocated ................. 90,439,680
SQL Group Space Used ..................... 87,293,952
SQL File Logical Name ..................... File1Group1
SQL File Physical Name .................... C:\Program Files\Microsoft SQL Server\MSSQL$RBSTEST11_2003\data\File1Group1_Data.NDF
SQL File Space Allocated ................... 47,382,528
SQL File Space Used ......................... 44,236,800
SQL File Logical Name ..................... File2Group1
SQL File Physical Name .................... C:\Program Files\Microsoft SQL Server\MSSQL$RBSTEST11_2003\data\File2Group1_Data.NDF
SQL File Space Allocated ................... 43,057,152
SQL File Space Used ......................... 43,057,152
SQL Group Logical Name .................... Group2
SQL Group Space Allocated ................... 2,097,152
SQL Group Space Used ....................... 2,097,152
SQL File Logical Name ..................... File1Group2
SQL File Physical Name .................... C:\Program Files\Microsoft SQL Server\MSSQL$RBSTEST11_2003\data\File1Group2_Data.NDF
SQL File Space Allocated ................... 1,048,576
SQL File Space Used ......................... 1,048,576
SQL File Logical Name ..................... File2Group2
SQL File Physical Name .................... C:\Program Files\Microsoft SQL Server\MSSQL$RBSTEST11_2003\data\File2Group2_Data.NDF
SQL File Space Allocated ................... 1,048,576
SQL File Space Used ......................... 1,048,576
SQL Group Logical Name .................... PRIMARY
SQL Group Space Allocated ................... 1,048,576
SQL Group Space Used ....................... 1,048,576
SQL File Logical Name ..................... Test1_Data
SQL File Physical Name .................... C:\Program Files\Microsoft SQL Server\MSSQL$RBSTEST11_2003\data\Test1_Data.MDF
SQL File Space Allocated ................... 1,048,576
SQL File Space Used ......................... 1,048,576
SQL Group Logical Name .................... TRANSACTION LOG
SQL Group Space Allocated ................... 104,595,456
SQL Group Space Used ....................... 12,009,472
SQL File Logical Name ..................... Test1_Log
SQL File Physical Name .................... C:\Program Files\Microsoft SQL Server\MSSQL$RBSTEST11_2003\data\Test1_Log.LDF
SQL File Space Allocated ................... 104,595,456
**Restore command**

Use this command to restore all or part of one or more SQL databases from Tivoli Storage Manager storage to a SQL server.

**Considerations:**
- You cannot restore SQL databases currently in use. By placing SQL databases to be restored in single-user mode, you can avoid attempting such restores. If you are restoring the master database, you must start the SQL server in single-user mode by using the -m SQL SERVER startup option. For user mode details, refer to “Setting user mode” on page 140.

**Notes:**
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.
   - You cannot restore backups to SQL Server 7.0 or later if they were created for SQL Server versions earlier than 7.0.

**Note:** When restoring large SQL databases, specifying a value of at least 10000 in the `commtimeout` option will help prevent a restore operation from ending prematurely. If the restore operation is performed in a LAN free environment, this value must be specified for the Storage Agent.
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 “Backup object types” on page 89.

**Restore Optional Parameters:**

- `/BUFFers` = 3 [or cfg value]
- `/BUFFERSize` = 1024 [or cfg value]
- `/CONFIGfile` = tdpsql.cfg
- `/DBOonly`
Chapter 5. Using the command line interface
A Restore File Options:

```
/REPlace
```

B Restore Full Options:

```
B1
B2
```
B1 Restore Full Options 1:

```
/RECOvery = Yes
/STANDby = undofilename
/REPlace
```

B2 Restore Full Options 2:

```
/Files = logicalfilename*
/Groups = groupname*
/PARTial = Yes
/RECOvery = No
/REPlace
```

C Restore Diff Options:

```
/RECOvery = Yes
/STANDby = undofilename
/REPlace
```

D Restore Group Options:

```
/Files = logicalfilename*
/REPlace
```
E Restore Log Options:

- /RECOvery = Yes
- /RECOvery = No
- /STANDby = undofilename
- /STOP AT = datetime
- /STOP AT Mark = markname
- /STOP BEFORE Mark = markname
- /AFTER = datetime
- /AFTER = datetime

F Restore Set Options:

- /Files = logicalfilename
- /Groups = groupname
- /REPlace

For a description of the restore options, see “Optional parameters” on page 103. For help output samples of restore options, see “Help output samples” on page 82.
Restore output samples

Restore 1–Full

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=rbstest07\rbstest07_2003
```

Output:

```
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

Starting Sql database restore...

Querying Tivoli Storage Manager server for a list of database backups, please wait...

Beginning full restore of backup object Test1, 1 of 1, to database Test1
Full: 0 Read: 89607680 Written: 89607680 Rate: 3,003.42 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: 3,002.90 Kb/Sec
Total bytes transferred: 89,607,680
Elapsed processing time: 29.14 Secs
```

Restore 2–Differential

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 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

Starting Sql database restore...

Querying Tivoli Storage Manager server for a list of database backups, please wait...

Beginning diff full 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
```

Chapter 5. Using the command line interface
Throughput rate: 40.61 Kb/Sec
Total bytes transferred: 478,720
Elapsed processing time: 11.51 Secs

Restore 3–Group

Restore 3 displays restoring a file group backup object named Group1 to database Test1.

Command:

tdpsqlc restore Test1 group=Group1

Output:

IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. 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

Restore 4–Set

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 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

Starting Sql database restore...

Querying Tivoli Storage Manager server for a list of database backups, please wait...

Restoring meta data ...

Beginning set restore of backup object Test1\20030718141546\00000700, 1 of 1, to database Test1
Full: 0 Read: 88489472 Written: 88489472 Rate: 8,125.58 Kb/Sec
Restore of Test1\20030718141546\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: 8,122.52 Kb/Sec
Total bytes transferred: 88,489,472
Elapsed processing time: 10.64 Secs

**Restore 5–Log (point in time)**

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="07/01/2003 13:56:00"
```

**Output:**

IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. 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\20030701135511\00000700, 1 of 4, to database Test1
Full: 0 Read: 214528 Written: 214528 Rate: 59.75 Kb/Sec
Restore of Test1\20030701135511\00000700 completed successfully.

Beginning log restore of backup object Test1\20030701135605\00000700, 2 of 4, to database Test1
Full: 0 Read: 147968 Written: 147968 Rate: 32.15 Kb/Sec
Restore of Test1\20030701135605\00000700 completed successfully.

Beginning log restore of backup object Test1\20030701135712\00000700, 3 of 4, to database Test1
Full: 0 Read: 0 Written: 0 Rate: 0.00 Kb/Sec
Restore of Test1\20030701135712\00000700 completed successfully.

Skipping Test1\20030701135817\00000700
because of the preceeding 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

**Chapter 5. Using the command line interface 73**
**Restore 6–Log (named mark)**

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:**

IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. 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 Testmark\20030701102947\0000065C, 1 of 4, to database Testmark
Full: 0 Read: 159232 Written: 159232 Rate: 61.68 Kb/Sec
Restore of Testmark\20030701102947\0000065C completed successfully.

Beginning log restore of backup object Testmark\20030701103127\00000010C, 2 of 4, to database Testmark
Full: 0 Read: 159232 Written: 159232 Rate: 34.51 Kb/Sec
Restore of Testmark\20030701103127\00000010C completed successfully.

Beginning log restore of backup object Testmark\20030701103325\00000680, 3 of 4, to database Testmark
Full: 0 Read: 0 Written: 0 Rate: 0.00 Kb/Sec
Restore of Testmark\20030701103325\00000680 completed successfully.

Skipping Testmark\20030701103556\00000694 because of the preceeding 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: 4

Throughput rate: 38.60 Kb/Sec
Total bytes transferred: 318,464
Elapsed processing time: 8.06 Secs

**Restore 7–Log (inactive object)**

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:**

IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

Backup Object Information
--------------------------
The restore operation for 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=20030622135511\00000700
```

Output:

```
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. 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\20030622135511\00000700, 1 of 1, to database Test1
Full: 0  Read: 214528  Written: 214528  Rate: 29.47 Kb/Sec
```
Restore of Test1\20030622135511\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

Restore 8—Full (partial)

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 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. 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: 89607680  Written: 89607680  Rate: 3,359.60 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: 3,359.21 Kb/Sec
Total bytes transferred: 89,607,680
Elapsed processing time: 26.05 Secs
Restore 9–Full (relocate)

Restore 9 displays restoring a full backup object of database Test1, specifically relocating logical file File1Group1 to a new physical location.

Command:

```
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 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. 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
Inactivate command

Use the `inactivate` command to inactivate one or more active 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.

**Note:** This command replaces the `adsmdelete` and `adsmautodelete` commands of Data Protection for SQL Version 1. To specify automatic inactivation by age, the `inactivate /olderthan` option replaces the `/ifolder` requirement of Version 1.

**Syntax**

```
 TDPSQLC--INACTIVATE dbname, File=logicalfilename
   FULL
   DIFFerential
   Group=groupname
   Log=logobjectname
   Set=setobjectname
```

For a description of the `inactivate` positional parameters, see “Backup object types” on page 89.

**Inactivate Optional Parameters:**

```
 /CONFIGfile=tdpsql.cfg
 /FROMSQLSERVER(sqlservername)
```
For a description of the `inactivate` options, see “Optional parameters” on page 103.
**Inactivate output samples**

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.

**Command:**
```
  tdpsqlc query tsm test1,test2 * /fromsqlserv=mutalisk
```

**Output:**
```
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. 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 .............. 06/17/2003 13:04:41
Backup Size .............................. 2,209,512,960
Database Object Name .................... 20030617130441\0000012D
Number of stripes in backup object ...... 1

SQL Server Name ......................... MUTALISK
SQL Database Name ........................ test1
Backup Object Type ....................... Log
Backup Object State ...................... Active
Backup Creation Date / Time .............. 06/17/2003 15:26:59
Backup Size .............................. 92,672
Database Object Name .................... 20030617152659\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 .............. 06/17/2003 16:06:58
Backup Size .............................. 15,236,608
Database Object Name .................... 20030617160658\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 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. 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\20030617152659\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 /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 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. 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** .......... 06/17/2003 13:04:41
**Backup Size** .............................. 2,209,512,960
**Database Object Name** ................. 20030617130441\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** .......... 06/17/2003 15:26:59
**Backup Size** .............................. 92,672
**Database Object Name** ................. 20030617152659\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)

Syntax

```
TDPSQLC Help
```

Help output samples

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 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

ACO5057I The C:\Program Files\Tivoli\TSM\TDPSql\tdpsql.log
log file was pruned successfully.

TDPSQLC Query TSM *|dbname[,dbname,...] [x]
```
Help 2-Restore Full

Command:

dpssq1c help rest full

Output:

IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
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TDPSQLC Restore *|dbname[,dbname,...] [Full]
[/BUFFers=numbuffers] default: 3 (or cfg value)
[/BUFFERSize=buffersizeinkb] default: 1024 (or cfg value)
[/CONFIGfile=configfilename] default: tdpsql.cfg
[/DBOonly]
[/Files=*|logicalname[,logicalname,...] ]
[/FROMSQLserver=sqlservername] default: sqlserver value (or cfg value)
[/GROUPs=*|groupname[,groupname,...] ]
[/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,...] ]
[/PARTial]
[/Quiet]
[/RECOvery=Yes|No] default: Yes
[/RELocate=lname /TO=pname [/RELocate=lname /TO=pname ...] ]
[/REPlace]
[/SQLAUTHentication=INTEGRATED|SQLuserid] default: INTTEGRATED
[/SQLBUFFers=numsqlbuffers] default: 0 (or cfg value)
[/SQLBUFFERSize=sqlbuffersizeinkb] default: 1024 (or cfg value)
[/SQLPassword=sqlpasswordname] default: " "
[/SQLSERVER=sqlservername] default: local computer name (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 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

TDPSQLC R *|dbname[,dbname,...] Log=*|logobjectname[,logobjectname,...]
[/BUFFers=numbuffers] default: 3 (or cfg value)
[/BUFFERSize=buffersizeinkb] default: 1024 (or cfg value)
[/CONFIGfile=configfilename] default: tdpsql.cfg
[/DBOnly]
[/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=sqlservername] default: local computer name (or cfg value)
[/SQLUSer=sqlusername] default: sa
[/STANDby=undofilename]
[/STOPAT=datet ime]
[/STOPATMark=markname [/AFTER=datet ime] ]
[/STOPBEFOREMark=markname [/AFTER=datet ime] ]
[/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 4-Set

Command:

```
tdpsqlc help set
```

Output:

IBM Tivoli Storage Manager for Databases:
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

TDPSQLC Set PARMname=value
[/CONFIGfile=configfilename] default: tdpsql.cfg

where PARMname and possible values are:

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 YYY.MM.DD
DIFFESTimate=numpercent (1..99)
FROM SQL server = 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
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,n.nn,dd
  6 n’nnn,dd
SQLAuthentication = [INTEGRATED | SQLuserid]
SQLBUFFers = numsqlbuffers (0..999)
SQLBUFFERSIZE = sqlbuffersize (64..4096)
SQLSERVER = sqlservername
STRIPES = numstripes (1..32) for SQL Server 7.0
       (1..64) for SQL Server 2000
TIMEformat = timeformatnum
  1 HH:MM:SS
  2 HH,MM,SS
  3 HH.MM.SS
  4 HH:MM:SSA/P
Set command

Use the set command to change the values for the Data Protection for SQL configurable parameters and options. The values are saved in a configuration file. The default file is tdpsql.cfg. Configuration values can also be set in the GUI Edit menu bar item (see “Menu bar” on page 27).

Note: If a configuration file is not specified, the tdpsql.cfg values are used, and a default configuration file is created with just the lastprunedate value. If an invalid or non-existent file is specified, the default values are used.

Syntax

```
TDPSQLC set BUFFers=numbuffers
    BUFFERSize=buffersizeinkb
    DATEformat=dateformatnum
    DIFFESTimate=numpercent
    FROMSQLserver=fromsqlserver
    LANGUAGE=language
    LOGFile=logfilename
    LOGPrune=numdays
    No
    NUMBERformat=numberformatnum
    MOUNTWaitfordata=Yes
    No
    SQLAUTHentication=INTEGRated
    SQLBUFFers=numsqlbuffers
    SQLBUFFersize=sqlbuffersizeinkb
    SQLSERVER=sqlservername
    STRIPes=numstripes
    TIMEformat=timeformatnum
```

For a description of the set positional parameters, see “Set” on page 97.

Set Optional Parameters:

```
/CONFIGfile=tdpsql.cfg
```

For a description of the set options, see “Optional parameters” on page 103.

Set output samples

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 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

ACO5054I The configuration option was set successfully.
The following two commands change the initial settings for both *sqlbuffers* and *stripes* to 2.

**Command:**
```
tdpsqlc set sqlbuff=2
```

**Output:**
```
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

AC05054I The configuration option was set successfully.
```

**Command:**
```
tdpsqlc set strip=2
```

**Output:**
```
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. 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.

Syntax

```
TDPSQLC—CHANGETSMPassword

oldpassword—newpassword—verifypassword
```

For a description of the changetsmpassword positional parameters, see “CHANGETSMPassword” on page 102.

Optional Parameters:

```
/CONFIGfile=	dpsq1.cfg=tdpsq1.cfg

/LOGFile=	dpsql.log

/LOGPrune=60 [or cfg value]

/TSMNODE=[dsm.opt value]

/TSMOPTFile=dsm.opt=dsmoptfilename
```

For a description of the changetsmpassword options, see “Optional parameters” on page 103.

Changetsmpassword output sample

The following displays changing the Tivoli Storage Manager password.

Command:

```
tdpsqlc changetsmp fert sqlv2 sqlv2
```

Output:

```
IBM Tivoli Storage Manager for Databases
Data Protection for Microsoft SQL Server
Version 5, Release 2, Level 1.0
(C) Copyright IBM Corporation 1997, 2003. All rights reserved.

ACO0260I Password successfully changed.
```
Chapter 6. Command line parameters

This chapter provides a full description of the command line parameters, both positional and optional, available in Data Protection for SQL. For the syntax of command line operations, see Chapter 5, “Data Protection for SQL commands” on page 48.

Positional parameters

Positional parameters follow Data Protection for SQL commands and precede optional parameters. This section describes the six backup object types available as positional parameters and other positional parameters for query, set, and changeTSMpassword.

Table 10. Data Protection for SQL positional parameters

<table>
<thead>
<tr>
<th>Command</th>
<th>Positional Parameters</th>
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<tr>
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<td>$dbname$ plus 6 backup type options</td>
<td>89</td>
</tr>
<tr>
<td>Query</td>
<td>$dbname$ SQL $dbname$, TDP TSM $dbname$ plus 8 options</td>
<td>94</td>
</tr>
<tr>
<td>Restore</td>
<td>$dbname$ plus 6 backup type options</td>
<td>89</td>
</tr>
<tr>
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<td>$dbname$ plus 6 backup type options</td>
<td>89</td>
</tr>
<tr>
<td>Set</td>
<td>15 options</td>
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</tr>
<tr>
<td>Change TSM</td>
<td>$oldpassword$ $newpassword$ $verifypassword$</td>
<td>102</td>
</tr>
</tbody>
</table>

$dbname$

*1$dbname,*...

This variable specifies the names of the SQL server databases to back up, restore, inactivate, or query.

Considerations

- Use * as a wildcard character in $dbname$ to replace zero or more characters for each occurrence. Specifying only the wildcard character indicates all databases on the SQL server.
- Do not specify tempdb; this database cannot be backed up or restored because it is newly created each time SQL Server starts. It is not included in a wildcard operation.
- If any $dbname$ includes spaces or special characters, you must enclose that $dbname$ in a single set of double quotes.
- SQL database names are case-sensitive.
- Standard Tivoli Storage Manager include/exclude processing applies to the SQL database names.

Backup object types

The following positional parameters are types of backup objects available when issuing Data Protection for SQL backup, restore, inactivate, and query commands:
Table 11. Data Protection for SQL backup object types

<table>
<thead>
<tr>
<th>Backup Object Types</th>
<th>Page</th>
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</thead>
<tbody>
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<tr>
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<td>93</td>
</tr>
</tbody>
</table>

* (with query TSM or inactivate)

Each of these is described in the following section.

**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.

For restore, this option restores file backup objects for the SQL databases you specify.

For inactivate, this option inactivates only the active file backup objects for the SQL databases you specify.

For information about querying Tivoli Storage Manager file backup objects, see page 95.

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 perform file backups for the following SQL databases:
  - Those with the SQL server option truncate log on checkpoint.
  - Those using the SQL Server 2000 SIMPLE recovery model.
- 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 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.

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.

For restore, this option restores all full database backup objects for the SQL databases you specify.

For inactivate, this option inactivates only the active 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.

For restore, this option saves time during a restore by replacing the restore of a number of transaction log backups.

For inactivate, 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.

**Group=**  
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 groupname 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 groupname 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 SQL Server 2000 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.

**Note:** For backup operations, log takes no values. However, for restore, query, and inactivate operations, the log parameter takes the wildcard or logobjectname value.

For commands other than backup, the logobjectname variable specifies the log backup objects to restore, inactivate, or query. 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:

- For commands other than backup, you can specify this parameter more than once per command invocation.
- 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 SQL Server 2000 SIMPLE recovery model.
- SQL Server 7.0 databases with the SQL server SELECT INTO / BULKCOPY option if unlogged changes have been made to the SQL database.

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.

Note: For backup operations, set takes no values. However, for restore, query, and inactivate operations, the set parameter takes the wildcard or setobjectname value.

For commands other than backup, the setobjectname variable specifies the set backup objects to restore, inactivate, or query. 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:
- For commands other than backup, you can specify this parameter more than once per command invocation.
- 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.

You cannot perform set backups for the following SQL databases:
- Those with the SQL Server attribute TRUNCATE LOG ON CHECKPOINT.
- Those using the SQL Server 2000 SIMPLE recovery model.

You cannot specify the /recovery parameter with restore set operations.

Notes:
1. You can specify the wildcard (*) to replace backup object types only when issuing the inactivate and query TSM commands. For inactivate, this inactivates all active backup objects for the specified SQL databases. In addition, the backup object types for inactivate are required parameters in contrast to those of the other commands, and there is no default.

2. 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

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

Query

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. For details on which SQL server is current, see /sqlserver in “Optional parameters” on page 103.

When querying a particular SQL Server 7.0 server, the following information is included:
- Name
- Version

If you specify /compatibilityinfo:
- Default sort order ID
- Default code page ID
- Unicode locale ID
- Unicode comparison style ID
- Clustering state

When querying a particular SQL Server 2000 server, the following information is included:
- Name
- Version

If you specify /compatibilityinfo:
- Clustering state

The dbname variable specifies databases on the current SQL server to display information about. For more information, see dbname in “Positional parameters” on page 89.

When querying a particular SQL Server 7.0 server database, 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
• Server default sort order id
• Server default code page id
• Server Unicode locale id
• Server Unicode comparison style id

When querying a particular SQL Server 2000 server database, 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.
For details on which configuration file is current, see /configfile in
“Optional parameters” on page 103.

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. For more information, see dbname in
“Positional parameters” on page 89.

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

If created from a SQL Server 7.0 database:
- SQL server default sort order ID
- SQL server default code page ID
- SQL server Unicode locale ID
- SQL server Unicode comparison style ID

Notes:
1. You can also determine which backup objects to display through the query TSM optional parameters /active and /all.
2. See /sqlserver in “Optional parameters” on page 103 for details on which SQL server is current.
3. The current Tivoli Storage Manager Server is specified in the current Tivoli Storage Manager options file.
4. See /tsmoptfile in “Optional parameters” on page 103 for details on which Tivoli Storage Manager options file is current.
5. See /tsmnode in “Optional parameters” on page 103 for details on which Tivoli Storage Manager node is current.
6. No information will be displayed if there are no backup objects for a specified SQL database.

Query TSM Options

For general information about these options, see “Backup object types” on page 89.

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. For file options under the query TSM command, see /fileinfo and /mountwait in “Optional parameters” on page 103.

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.

**Note:** The `/fileinfo` option is allowed under the `full`, `diff`, `log`, `file`, `group`, and `set` parameters. Information displayed with the `/fileinfo` optional parameter includes the following:

- SQL database group name
- SQL database group space allocated
- SQL database group space used
- SQL database logical file name
- SQL database physical file name
- SQL database file space allocated
- SQL database file space used

**Set**

To set default values in the Data Protection for SQL configuration file, specify one of the following when issuing a `set` command.

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 5. The intitial 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.

Changes to the value of the `dateformat` parameter can result in an undesired pruning of the &agentname; 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 &agentname;.
- 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 `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.

Considerations:

- 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.
• 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.

**FROMSQLSERVER=sqlservername**
The `fromsqlserver` parameter specifies the SQL server that backup objects were backed up from. This parameter is necessary only when the name of the SQL server to restore to, as determined by the `sqlserver` parameter, is different from the name of the SQL server that the backup objects were created from. See page 115 for a description of `sqlservername`.

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.

**LANGUAGE=language**
Specify the three-character code of the language you want to use to display messages:
- CHS Simplified Chinese
- CHT Traditional Chinese
- DEU Standard German
- ENU American English (This is the default.)
- ESP Standard Spanish
- FRA Standard French
- ITA Standard Italian
- JPN Japanese
- KOR Korean
- PTB Brazilian Portuguese

**LOGFile=logfilename**
The `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.

**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 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`.

**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 meta data 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.

**Notes:**

• This option does not affect the Data Protection for SQL query command, which is specified only through the query TSM /fileinfo parameter.
• The TAPEPROMPT option in the Tivoli Storage Manager options file no longer affects the operation of this parameter as in Version 1 of Data Protection for SQL.

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 squserid value to specify SQL Server user id authorization. The user id specified by the squserid 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. For SQL Server 7.0, up to 32 stripes may be specified, and for SQL Server 2000, up to 64 stripes. 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.

SQLSERVER=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.

For further information, including named instances and clustering considerations, see page 115.

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 32 for SQL Server 7.0, and from 1 to 64 for SQL Server 2000. The default is initially 1.

For further considerations, see page 119.
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:

1. 23:00:00
2. 23,00,00
3. 23.00.00
4. 11:00:00A/P

Changes to the value of the `timeformat` parameter can result in an undesired pruning of the 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.
- Specify a new log file with the `/logfile` parameter.

### CHANGETSMPassword

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.
Optional parameters

Table 12 lists the optional parameters that can follow the positional parameters in the Data Protection for SQL command line. The options, listed alphabetically, are fully described on the pages listed.

For syntax diagrams displaying the options available to each command, refer to “Data Protection for SQL commands” on page 48.

Table 12: Data Protection for SQL optional parameters

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<th>Optional Parameters</th>
<th>Brief Description</th>
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<td>/ACTIVE</td>
<td>Queries active backup objects.</td>
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<tr>
<td>/ALL</td>
<td>Queries active and inactive backup objects.</td>
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<tr>
<td>/BUFFERS</td>
<td>Specifies the number of Data Protection for SQL data buffers for each data stripe.</td>
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<tr>
<td>/BUFFERSIZE</td>
<td>Specifies the size of each Data Protection for SQL buffer specified by /buffers.</td>
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<tr>
<td>/COMPATIBILITYINFO</td>
<td>Queries the compatibility of a backup object with a SQL server.</td>
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<tr>
<td>/CONFIGFILE</td>
<td>Specifies the name of the Data Protection for SQL configuration file.</td>
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<tr>
<td>/DBONLY</td>
<td>Prevents general users from accessing a restored database.</td>
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<tr>
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<td>Estimates the fraction of a SQL database that has changed since its last full database backup.</td>
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<tr>
<td>/FILEINFO</td>
<td>Queries groups and files that comprise a backup object.</td>
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<tr>
<td>/FILES</td>
<td>Specifies logical files for backup and restore operations.</td>
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<tr>
<td>/FROMSQLSERVER</td>
<td>Specifies the SQL server that backup objects were created from.</td>
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<td>Estimates the fraction of a SQL database that has changed due to non-logged operations since its last log, differential, or full database backup (SQL Server 2000).</td>
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<td>Specifies the activity log generated by Data Protection for SQL.</td>
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<td>/LOGPRUNE</td>
<td>Specifies Data Protection for SQL activity log pruning and how many days of entries are saved.</td>
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<tr>
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<td>Specifies whether or not Data Protection for SQL waits for a required storage volume to be mounted by the Tivoli Storage Manager Server.</td>
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<tr>
<td>/OBJECT</td>
<td>Queries, restores, or inactivates specified backup objects.</td>
<td>111</td>
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<tr>
<td>/OLDER THAN</td>
<td>Inactivates only backup objects of a specified age.</td>
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<tr>
<td>/PARTIAL</td>
<td>Restores part of a database for SQL Server 2000.</td>
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Table 12. Data Protection for SQL optional parameters (continued)

<table>
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<th>Optional Parameters</th>
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<td>/Quiet</td>
<td>Omits the display of command status information.</td>
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<td>Specifies whether or not to make additional restores to a database not on a standby server.</td>
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<td>Restores a SQL database file to a new location.</td>
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<td>/SQLAUTHentication</td>
<td>Specifies the authorization mode used when logging on to the SQL server.</td>
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<td>/SQLBUFFers</td>
<td>Specifies the total number of buffers SQL Server uses to transfer data between SQL Server and Data Protection for SQL.</td>
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<td>/SQLBUFFERSIze</td>
<td>Specifies the size of each buffer specified by /sqlbuffers.</td>
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</tr>
<tr>
<td>/SQLPassword</td>
<td>Specifies the SQL password that Data Protection for SQL uses to log on to the SQL server.</td>
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</tr>
<tr>
<td>/SQLSERVer</td>
<td>Specifies the SQL server that Data Protection for SQL logs on to.</td>
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<tr>
<td>/SQLUSer</td>
<td>Specifies the name that Data Protection for SQL uses to log on to the SQL server.</td>
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<td>/STANDby</td>
<td>Restores to a standby SQL server.</td>
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<tr>
<td>/STOPAT</td>
<td>Restores a SQL database to a specified point in time.</td>
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<tr>
<td>/STOPATMark /AFTER</td>
<td>Restores to a named point in time, which may be after a specified point in time. (SQL Server 2000)</td>
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<tr>
<td>/STOPEBFOREMark /AFTER</td>
<td>Restores to a named point in time, which may be after a specified point in time. (SQL Server 2000)</td>
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</tr>
<tr>
<td>/STRIPes</td>
<td>Specifies the number of data stripes to use in a backup or restore operation.</td>
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<tr>
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<td>/TSMNODE</td>
<td>Specifies the Tivoli Storage Manager node name used by Data Protection for SQL to log on to the Tivoli Storage Manager Server.</td>
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<tr>
<td>/TSMOPTFile</td>
<td>Specifies the Tivoli Storage Manager options file to use.</td>
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</tr>
<tr>
<td>/TSMPassword</td>
<td>Specifies the Tivoli Storage Manager password used by Data Protection for SQL to log on to the Tivoli Storage Manager Server.</td>
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</tr>
</tbody>
</table>

The following are detailed descriptions of each of the optional parameters:

/ACtive

/ALl For query TSM operations, these parameters specify whether you want to display only active backup objects or both active and inactive.

Considerations:

- You can specify both of these parameters for a Data Protection for SQLquery command, but only the last one specified will be used.
• If you specify neither parameter, the default is /active.
• To specify inactive (or active) backup objects for restore purposes, use the /object parameter (see page 111) or use the GUI (see page 36).

See page 81 for sample output using /all.

/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.

/COMPATibilityinfo
For query operations, this parameter displays information related to the compatibility of a backup object with a SQL server. Certain SQL Server configuration options must be compatible before you can restore a backup object to a SQL server. When you specify this parameter, SQL and 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. For a list of items included in the display, see page 95.

Considerations:
• You cannot specify this parameter with the types parameter on a query TSM command.
• 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.

• Unlike SQL Server 7.0, SQL Server 2000 allows different collations at the server, database, column, and variable levels. This makes these compatibility issues much less of a concern, but they can still be a problem.

/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” on page 97 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.

/DBOonly

Specifying the /dboonly parameter prevents general users from accessing a restored database before it is determined to be ready for such access.

For SQL Server 7.0, this parameter ensures that the database option DBO USE ONLY is set after a restore operation.

For SQL Server 2000, this parameter ensures that the database option RESTRICTED USER is set after a restore operation.

/DIFFESTimate=numpercent

For differential database backups, /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 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.

Considerations:

• 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.

• 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.
If you specify /diffestimate on a Data Protection for SQL command, its value is used instead of the value in the Data Protection for SQL configuration file. However, specifying the parameter on a Data Protection for SQL command does not change the value in the Data Protection for SQL configuration file.

/FILEInfo
For the query TSM command, this parameter displays detailed information about a backup object for all backup types. For differential and log backup objects, /fileinfo displays all of the groups and files in a database at the time of the backup. For the type of information displayed, see page 95.

If the Tivoli Storage Manager management classes for Data Protection for SQL meta objects do not specify disk-only storage pools, a volume mount is possible with this parameter. See page 110 for more information.

/files=* logicalfilename,...
For backup operations, /files specifies the names of the logical files to include in a set backup.

For restore operations, /files specifies the names of the logical files restored from a full, group, or set backup object.

The logicalfilename variable specifies the names of the SQL Server database logical files you want to back up or restore to.

Considerations:
- Use the * character as a wildcard character in logicalfilename to replace zero or more characters for each occurrence. By specifying only the wildcard character, you indicate all logical files in the SQL server database.
- If logicalfilename includes spaces or special characters, enclose it in double quotes.
- You can specify either /files or /groups, or specify both. For restore, this applies to a full or set backup object. If you specify either /files or /groups or both for restore, only restore objects that match at least one of the /groups or /files specifications will be restored.

/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. See page 115 for a description of sqlservername.

Use /fromsqlserver for query TSM and inactivate commands, but use /sqlserver for query SQL commands. See a sample using /fromsqlserver with query and inactivate on page 80.

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.

/GROUPS=*|groupname,...

For backup operations, /GROUPS specifies the names of file groups you
want to include in a set backup.

For restore operations, /GROUPS specifies the names of file groups you want
to restore from a full or set backup object. If you specify either /FILES or
/GROUPS or both for restore, only restore objects that match at least one of
the /GROUPS or /FILES specifications will be restored.

Use the GROUPNAME variable to specify the names of the SQL server
database file groups you want to back up or restore.

Considerations:

- Use the * character as a wildcard character in GROUPNAME to replace zero
  or more characters for each occurrence. Specifying only the wildcard
  character indicates all file groups in the SQL server database.

- If GROUPNAME includes spaces or special characters, enclose it in double
  quotes.

- You can specify either /FILES or /GROUPS, or specify both.

/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.

See “dbname” on page 89 for details on this variable.

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.

/LOGESTIMATE=numpercent

Unlike SQL Server 7.0, SQL Server 2000 allows transaction log backups
even after non-logged operations such as SELECT INTO and BULK COPY.
SQL Server 2000 does this by appending the storage pages changed by the
non-logged operations to the end of the transaction log backup.

For SQL Server 2000 log backups, /LOGESTIMATE specifies the estimated
fraction of an entire SQL database that has changed due to non-logged
operations since its last log, differential, or full database backup. This
estimate is needed because SQL Server does not provide a way to
determine the size of non-logged changes, and because the Tivoli Storage
Manager Server requires an accurate size estimate to efficiently allocate
space and place objects. Because a separate backup object is created for
each specified SQL database, this estimate applies to each specified SQL
database individually.
The `numpercent` variable can range from 0 to 99. Because a log backup with non-logged changes backs up database pages, this number is the percent of database pages changed since the last log, differential, or full database backup. The initial value is 0.

Considerations:

- 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.
- 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.
- If you specify `/logestimate` on a Data Protection for SQL command, its value is used instead of the value in the Data Protection for SQL configuration file. However, specifying the parameter on a command does not change the value in the configuration file.

`/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.

`/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.

`/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 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.

Note: The TAPEPROMPT option in the Tivoli Storage Manager options file no longer affects the operation of this parameter as in Data Protection for SQL Version 1.

/OBJect= * | objectname,...

For restore and inactivate operations, /object specifies that only particular backup objects for the specified SQL databases and backup object type (if specified) be restored or inactivated. For query operations, /object includes particular objects and object types in the display.

The objectname variable specifies the names of the backup objects you want to restore or inactivate. The object name uniquely identifies each backup object and is created by Data Protection for SQL. Use query to view the names of backup objects.

Considerations:
• For restore operations, you can select inactive backup objects for restore using this parameter though it is probably easier to do so using the GUI (see page 36). 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.

See page 75 for a sample using this parameter.

/OLDERthan= numdaysold

For inactivate operations, /olderthan 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 /olderthan.

See page 80 for a sample using this parameter.

/PARTial

Notes:
1. Partial restores are only available with SQL Server 2000 servers.
2. You can perform partial restores only on full database backup objects.

The /partial parameter restores only part of a SQL database. 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.

See page 76 for a sample using this parameter.

/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. See page 117 for more information. 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 incompletely 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:

<table>
<thead>
<tr>
<th>Sequence of Restores</th>
<th>Specify</th>
</tr>
</thead>
<tbody>
<tr>
<td>full database</td>
<td>no</td>
</tr>
<tr>
<td>differential database</td>
<td>no</td>
</tr>
<tr>
<td>transaction log backup object</td>
<td>no</td>
</tr>
<tr>
<td>transaction log backup object</td>
<td>yes</td>
</tr>
</tbody>
</table>

Notes:
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.

Note: For SQL Server 2000, all backup types allow these parameters. For SQL Server 7.0, all backup types are allowed except log backup objects.

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.

See page 77 for a sample using this parameter.

/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:
1. 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.
2. You are performing a file, group, or set restore, and one or more of the SQL files already exist.

/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.

**Note:** SQL Server authentication is provided by SQL Server only for compatibility with prior releases; Microsoft recommends using Windows authentication. To specify this, see page 114.

- 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=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.

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.

Note: Named instances are available only with SQL Server 2000 or later, but a SQL Server 7.0 server can be a default instance when there are named instances. It is not necessary to have a default instance to have named instances.

/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.
Note: SQL Server authentication is provided by SQL Server only for compatibility with prior releases; Microsoft recommends using Windows authentication. To specify this, see page 114.

- 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
For restore operations, /standby 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.
- 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=datatime
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 datatime variable specifies both the date and time separated by a space. Use any valid date and time format accepted by SQL Server. See page 73 for a sample.

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 datatime 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.

See page 73 for a sample using this parameter.

/stoptatmark=markname [/after=datatime]
**Note:** Restoring to a mark is only available with SQL Server 2000 servers.

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 can not 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`.

See page 74 for a sample using this parameter.

`/STOPBEFOREMark=markname [/AFTER=datetimetime]`

**Note:** Restoring to a mark is only available with SQL Server 2000 servers.

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 cannot use a Data Protection for SQL restore command with /stopbeforemrk and also specify /recovery=no or /standby.
- If the restore operation with /stopbeforemk 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 32 for SQL Server 7.0, and from 1 to 64 for SQL Server 2000.

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.

Note: In the configuration file, you can set stripes from 1 to 64. However, for SQL Server 7.0, Data Protection for SQL forces striping to a value of 32 for any value specified over 32.

- If you specify /stripes but not numstripes, the stored value is used.
- For a SQL Server 7.0 restore of a backup object, you must use the same number of data stripes as was used to create the backup object.
- For a SQL Server 2000 restore, 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 dsmserv.opt file. SQL server allows a maximum of 32 data stripes, and SQL Server 2000 allows a maximum of 64 data stripes.

/TRUNCate=Yes|No

The /truncate parameter specifies whether or not to dispose of entries you no longer need in the SQL database’s transaction log.

You can specify:

Yes SQL Server truncates the transaction log up to the active portion of the log after you back up the log. This is the normal operation for most transaction log backups and the default.

No SQL Server does not truncate the transaction log after you back it up. Use this primarily to back up the transaction log after its database is damaged or becomes suspect.

Considerations:

- In SQL Server 7.0, the database’s primary file group must be available and undamaged in order to back up the transaction log.
- In SQL Server 2000, you can back up the transaction log with this parameter even if all data files are damaged or unavailable.
- If you do not specify /truncate, the default value is yes.
- If you specify /truncate but specify neither yes nor no, the default value yes is used.

/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><code>/tsmpassword</code></th>
<th><code>PASSWORDACCESS</code> 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><code>generate</code></td>
<td>yes</td>
<td><code>/tsmpassword</code> ignored</td>
</tr>
<tr>
<td>specified</td>
<td><code>generate</code></td>
<td>no</td>
<td><code>/tsmpassword</code> used and stored</td>
</tr>
<tr>
<td>specified</td>
<td><code>prompt</code></td>
<td>—</td>
<td><code>/tsmpassword</code> used</td>
</tr>
<tr>
<td>not specified</td>
<td><code>prompt</code></td>
<td>—</td>
<td>user is prompted</td>
</tr>
</tbody>
</table>
Appendix A. 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 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 schedule for other Data Protection for Microsoft SQL Server applications on Windows as well.

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.
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 `d:\Program Files\Tivoli\TSM\baclient` directory.
- Data Protection for SQL is installed on the SQL Server in the `d:\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 d:\"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 (`d:\"Program Files"\Tivoli\TSM\baclient`). You can also use the short form of a pathname by placing a tilde (~) and unique identifier after the first six characters in the 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:"d:\Program Files\Tivoli\TSM\baclient" /optfile:"d:\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
      ```
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 fileshare 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 NT Client Service Configuration Utility
Command Line Interface - Version 5, Release 1, Level 5.0 c4
(C) Copyright IBM Corporation, 1990, 2002, All Rights Reserved.
Last Updated May 29 2002
TSM Api Verison 5.1.5

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\TDPSq\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 launostart: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>

   Replace <nodename> with your Data Protection for SQL node name. For example:
   SOFTWARE\IBM\ADSM\CurrentVersion\BackupClient\NODES\MYNODE

9. In the Windows command prompt window, change to the Data Protection for SQL installation directory.
   cd /d d:"Program Files"\Tivoli\TSM\TDPSql

Appendix A. Using the Tivoli Storage Manager scheduler 127
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 1, Level 5.0  
   (C) Copyright IBM Corporation 1990, 2002 All Rights Reserved.

   Querying server for next scheduled event.  
   Node Name: MYNODE  
   Session established with server TYPP_CLINT: Win 2000

   Server Version 5, Release 1, Level 3.0  

   Next operation scheduled:  
   -------------------------------
   Schedule Name: DATA PROTECTION FOR SQL SCHEDULER  
   Action: Command  
   Objects: C:\sqlfull.cmd  
   Options:  
   Server Window Start: 13:40:30 on 06/25/2002

   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 considerations**

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

    d:\Program Files\Tivoli\TSM\TDPSql\dsmsched.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 (dsmsched.log). After scheduled work is performed, check the log to ensure the work completed successfully.

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

    Scheduled event eventname completed successfully

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

    Finished command. Return code is:

• If `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 B. Silent installation

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 install 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)**
If you are running Windows 2000 (or later) or if `msiexec.exe` is installed on your Windows NT system, you can bypass the `setup.exe` method and directly install the MSI package.

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

**Table 13. Silent installation options**

<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>/I*v</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 (msiexec.exe). 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>
</tbody>
</table>
### Table 13. Silent installation options (continued)

<table>
<thead>
<tr>
<th>Option</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>installdir</strong></td>
<td>Specifies the directory where Data Protection for SQL is to be installed.</td>
</tr>
</tbody>
</table>
| **reboot** | Specifies whether or not to prompt the user to reboot the system after silent installation.  
  - *Force* Always prompts user to reboot after silent installation.  
  - *Suppress* Suppress prompt to reboot after silent installation.  
  - *ReallySuppress* Suppress all reboots and prompts to reboot after silent installation. |
| **rebootyesno** | 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. |
| **transforms** | Specifies language to install. |

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

### Table 14. Silent installation features (base client only)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Client</strong></td>
<td>Data Protection for SQL code</td>
</tr>
<tr>
<td><strong>Docs</strong></td>
<td>Data Protection for SQL Readme and User’s Guide (HTML and PDF format)</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 15. 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 16. 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>
</tbody>
</table>
Table 16. Silent installation transforms (continued)

<table>
<thead>
<tr>
<th>Transform</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>2052.mst</td>
<td>CHS Chinese (Simplified)</td>
</tr>
</tbody>
</table>

Installing with the Setup Program (setup.exe)

**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 15 on page 132.

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\""
ADDLOCAL=\"Client,License_Paid,Docs\"
TRANSFORMS=1033.mst /qn /I+v \"e:\log.txt\"
```

**Notes:**

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 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 with MSI (msiexec.exe)

**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 15 on page 132.
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,Docs"
TRANSFORMS=1033.mst /qn /i\v "e:\log.txt"
```

**Notes:**
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 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-ROM 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. anti-virus software)

Before contacting support, you can check for the following:

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

Cross-domain installs 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.
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](http://support.installshield.com/default.asp), and use the Search facility to obtain information on the error.
Appendix C. Advanced procedures

Sample include/exclude statements

To exploit automatic version control and expiration, you are able to set policy for each type of backup data, illustrated by the following Data Protection for SQL options file INCLUDE/EXCLUDE statements (see “Setting automatic expiration” on page 22 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 <code>backupType</code> 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 names (g1, f1)</td>
<td>...\g1\group*</td>
</tr>
<tr>
<td></td>
<td>...\f1\file*</td>
</tr>
<tr>
<td>All group or file object names beginning with (g) or (f)</td>
<td>...\g*\group*</td>
</tr>
<tr>
<td></td>
<td>...\f*\file*</td>
</tr>
<tr>
<td>Same as <code>\...\group*</code> or <code>\...\file*</code></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 <code>Db1</code></td>
<td>...\Db1...*</td>
</tr>
<tr>
<td>All objects with database name <code>Db1</code> beginning with <code>Db</code></td>
<td>...\Db*...*</td>
</tr>
<tr>
<td>Ambiguous</td>
<td>...*...*</td>
</tr>
<tr>
<td>All full or diff objects with database name <code>Db1</code></td>
<td>...\Db1\full*</td>
</tr>
<tr>
<td></td>
<td>...\Db1\diff*</td>
</tr>
<tr>
<td>All log, group, file, or set objects with database name <code>Db1</code></td>
<td>...\Db1...\log*</td>
</tr>
<tr>
<td></td>
<td>...\Db1...\group*</td>
</tr>
<tr>
<td></td>
<td>etc.</td>
</tr>
<tr>
<td>All group or file object names (g1, f1) with database name <code>Db1</code></td>
<td>...\Db1\g1\group*</td>
</tr>
<tr>
<td></td>
<td>...\Db1\f1\file*</td>
</tr>
<tr>
<td>All group or file object names beginning with (g) or (f) with database name <code>Db1</code></td>
<td>...\Db1\g*\group*</td>
</tr>
<tr>
<td></td>
<td>...\Db1\f*\file*</td>
</tr>
<tr>
<td>Same as <code>\...\Db1\...\group*</code> or <code>\...\file*</code></td>
<td>...\Db1*\group*</td>
</tr>
<tr>
<td></td>
<td>...\Db1*\file*</td>
</tr>
<tr>
<td>Same as <code>\...\Db1\full*</code></td>
<td>...\Db1...\full*</td>
</tr>
</tbody>
</table>
### BackupType Object with Database Matches

<table>
<thead>
<tr>
<th>Specification</th>
</tr>
</thead>
</table>
| Same as \\
| full* |
| Same as \\
| group* |
| Same as \\
| g1\group* |
| Ambiguous |
| Nothing (typeid missing) |

### Meta & Data Object Matches

<table>
<thead>
<tr>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>All meta or data objects</td>
</tr>
<tr>
<td>All meta or data full, log, or group objects</td>
</tr>
<tr>
<td>All meta or data group object names (g1)</td>
</tr>
<tr>
<td>All meta or data group object names beginning with g</td>
</tr>
</tbody>
</table>
| Same as \\
| meta\data\group* |
| Nothing (qualifiers missing) |

### Meta & Data Object with Database Matches

<table>
<thead>
<tr>
<th>Specification</th>
</tr>
</thead>
<tbody>
<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 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>
</tbody>
</table>
| Same as \\
| meta\data\Db1\group* |

---

138  IBM Tivoli Storage Manager for Databases: Data Protection for Microsoft SQL Server Installation and User’s Guide
### Meta & Data Object with Database Matches Specification

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same as <code>\...\meta\data\full*</code></td>
<td><code>\...\meta\full*</code></td>
</tr>
<tr>
<td>etc.</td>
<td></td>
</tr>
<tr>
<td>Same as <code>\...\meta\data\group*</code></td>
<td><code>\...\meta\group*</code></td>
</tr>
<tr>
<td>etc.</td>
<td></td>
</tr>
<tr>
<td>Same as <code>\...\meta\data\g1\group*</code></td>
<td><code>\...\meta\g1\group*</code></td>
</tr>
<tr>
<td>etc.</td>
<td></td>
</tr>
<tr>
<td>Ambiguous</td>
<td><code>\...\meta\log*</code></td>
</tr>
<tr>
<td><code>\...\data\log*</code></td>
<td></td>
</tr>
</tbody>
</table>

### Server Matches Specification

<table>
<thead>
<tr>
<th>Description</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>All objects from all servers beginning with <code>SQL</code></td>
<td><code>SQL\...\</code></td>
</tr>
<tr>
<td>All objects from server <code>SQL70</code></td>
<td><code>SQL70\...\</code></td>
</tr>
<tr>
<td>All objects from server <code>SQL70</code> with database name <code>Db1</code></td>
<td><code>SQL70\...\Db1\...\</code></td>
</tr>
<tr>
<td>All full objects from server <code>SQL70</code> with database name <code>Db1</code></td>
<td><code>SQL70\...\Db1\full*</code></td>
</tr>
<tr>
<td>All meta or data objects from server <code>SQL70</code></td>
<td><code>SQL70\meta\...\</code></td>
</tr>
<tr>
<td><code>SQL70\data\...\</code></td>
<td></td>
</tr>
<tr>
<td>All objects from all server instances with host <code>SQL2000</code></td>
<td><code>SQL2000\...\</code></td>
</tr>
<tr>
<td>All objects from server <code>SQL2000\INST1</code></td>
<td><code>SQL2000\INST1\...\</code></td>
</tr>
<tr>
<td>All objects from all servers beginning with <code>SQL2000\INST</code></td>
<td><code>SQL2000\INST\...\</code></td>
</tr>
<tr>
<td>Same as <code>SQL2000\...\</code></td>
<td><code>SQL2000\...\</code></td>
</tr>
<tr>
<td>All meta or data objects from server <code>SQL2000\INST1</code></td>
<td><code>SQL2000\INST1\meta\...\</code></td>
</tr>
<tr>
<td><code>SQL2000\INST1\data\...\</code></td>
<td></td>
</tr>
<tr>
<td>All meta or data objects from all named server instances with host <code>SQL2000</code></td>
<td><code>SQL2000\...\meta\...\</code></td>
</tr>
<tr>
<td>etc.</td>
<td></td>
</tr>
<tr>
<td>All meta or data objects from all server instances with host <code>SQL2000</code></td>
<td><code>SQL2000\...\meta\...\</code></td>
</tr>
<tr>
<td>etc.</td>
<td></td>
</tr>
<tr>
<td>All objects from server default instance (if no instance name matches <code>??ta</code>)</td>
<td><code>SQL2000\??ta\meta\...\</code></td>
</tr>
<tr>
<td><code>SQL2000\??ta\data\...\</code></td>
<td></td>
</tr>
</tbody>
</table>

### 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.

For detailed instructions, refer to the SQL Server online documentation.

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 or as an NT service. See also Note 1 under “Setting user mode”.
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_droplog, sp_addserver, sp_dropserv, sp_addremotelogin

**Setting user mode**

Setting user mode may be necessary during restore procedures. 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 place the SQL server in single-user mode. For additional information or assistance with SQL commands, contact Microsoft.

To set user mode in SQL Server 7.0:

```
SP_DBOPTION 'DBNAME', 'SINGLE USER', 'TRUE'
```

This SQL stored procedure sets a database to single-user mode.
SP_DBOPTION 'DBNAME', 'SINGLE USER', 'FALSE'
This returns a database to multiple-user mode.

To set user mode in SQL Server 2000:
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.

Notes:
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.
3. If necessary, you can use KILL SPID in SQL Server 7.0 to terminate user processes on the databases.
Appendix D. Problem determination aids

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 Enterprise Manager by selecting Server->Management->SQL Server Logs->Current or Archive #n.
- The Tivoli Storage Manager scheduler logs information to both the dsmsched.log and the dsmserror.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.
Appendix E. 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 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.

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: 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: None

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: 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: 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 within 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: None

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: None

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: None

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: None

ACO0217E The Tivoli Storage Manager filespace name is invalid.
Explanation: The filespace name or directory delimiter is invalid.
System Action: None

ACO0218E The Tivoli Storage Manager high level qualifier is invalid.
Explanation: The high level qualifier name or directory delimiter is invalid.
System Action: None

ACO0219E The Tivoli Storage Manager low level qualifier is invalid.
Explanation: The low level qualifier name or directory delimiter is invalid.
System Action: None

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: None

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: Check the options.doc file for a description of possible causes of the error, or see your system administrator.

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 a location to which you have write access.

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 'errlogname' 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.

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 server name.

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 server name 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 server name 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.

System Action: None
User Response: None Centrally logged

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 backups 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.

System Action: None
User Response: None Centrally logged

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.
System Action: None
User Response: None

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 logfile 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 logfile log file was pruned successfully.

Explanation: The log file mentioned pruned successfully.
System Action: Processing continues.
User Response: None.

ACO5058W The logfile name is greater than the maximum allowed. Processing will continue using a logfile name of logfile 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 logfile log file cannot be opened for writing. There will be no logging of events.

Explanation: The log mentioned could not be opened for appends. Therefore, no logging is performed.
System Action: Processing continues without logging.
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.

Explanation: A Tivoli Storage Manager API error has occurred.
System Action: Processing ends.
User Response: Retry the operation. If the error persists, contact your service representative.
ACO5061E  A Microsoft SQL API error has occurred.
Explanation:  A Microsoft SQL API error occurred.
System Action:  Processing ends.
User Response:  Retry the operation. If the error persists, contact your service representative.

ACO5063I  The logfilename log file did not need pruning.
Explanation:  The log file specified did not need to be pruned.
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 logfilename 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.

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 and 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 A SQL API error has occurred.
Explanation: 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
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 cannot 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.

**User Response:** 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:** 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.

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.
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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

administrative client. A program that runs on a file server, workstation, or mainframe that allows administrators to control and monitor the server through administrator commands. Contrast with backup-archive client.

administrator. A user who has been registered to the server. Administrators can be authorized to one or more of the following administrative privilege classes: system, policy, storage, operator, or analyst. Administrators can use the administrative client to enter server commands and queries in accordance with their privileges.

application program 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.

B

backup-archive client. A program that runs on a workstation or file server and provides a means for users to back up, archive, restore, and retrieve files. Contrast with administrative client.

backup copy group. A policy object containing attributes that control the generation, destination, and expiration of backup files. A backup copy group belongs to a management class.

C

central scheduler. A function that allows an administrator to schedule client operations and administrative commands. The operations can be scheduled to occur periodically or on an explicit date.

client 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.

client/server. A system architecture in which one or more programs (clients) request computing or data services from another program (server).

closed registration. A registration process in which an administrator must register workstations as client nodes with the server.

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 protocol. A set of defined interfaces that allow 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 group.** A 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.

**D**

Data Protection for SQL. A Tivoli Storage Manager application that allows you to perform online backups of Microsoft SQL databases to Tivoli Storage Manager storage.

**F**

full backup. A Tivoli Storage Manager function that copies the entire database. A full backup begins a new database backup series.

**G**

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.

**I**

incremental backups. (1) A function that allows users to back up files or directories that are new or have changed since the last incremental backup. With this function, users can back up files or directories from a client domain that are not excluded in the include-exclude list and that meet the requirements for frequency, mode, and serialization as defined in the backup copy group of the management class assigned to the files. (2) A Tivoli Storage Manager function that copies only the transaction logs for the database that are new or changed since the last full or incremental backup. Contrast with full backup.

**M**

management class. A Tivoli Storage Manager policy object that associates specific policies for backups, archives, and space management with client files. A management class can contain both a backup and archive copy group, only a copy group, or only an archive copy group. Management classes can also include space management policy for Hierarchical Storage Management (HSM) clients.

**P**

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.

**R**

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.


Tivoli Storage Manager. A client/server program that provides storage management to customers in a multivendor computer environment.
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