IBM Tivoli Storage Manager for Databases Version 5.2

Data Protection for Oracle for UNIX Installation and User's Guide

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Contents

Summary of Changes

Changes for this publication are summarized below.

April 2003, Version 5 Release 2.0

This release contains the following changes:

- Support for the Linux operating system. See "Installing Data Protection for Oracle on Linux 32-bit" on page 20 for detailed information.
- Support for the AIX 5L (Version 5.1) operating system. See "Installing Data Protection for Oracle on AIX 64-bit" on page 10 for detailed information.
- Support for the Solaris 9 operating system. See "Installing Data Protection for Oracle on Solaris 32-bit" on page 22 for detailed information.
- Support for Oracle 9i databases.
- A quick start procedure is available to assist in setting up your Data Protection for Oracle environment. See Appendix A, "Quick start guide", on page 45 for more information.

Preface

IBM Tivoli Storage Manager for Databases Version 5.2 Data Protection for Oracle is referred to as *Data Protection for Oracle* throughout this book.

Data Protection for Oracle performs online or offline backups of Oracle8i or Oracle9i databases to Tivoli Storage Manager storage. This integration with the RMAN Media Management API maximizes the protection of data, thus providing a comprehensive storage management solution.

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

Who should read this publication

The target audience for this publication are system installers, system users, Oracle database administrators, and system administrators .

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

- HP-UX

- Linux

- Solaris Operating Environment (hereinafter referred to as Solaris)

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

Title	Order Number
IBM Tivoli Storage Manager for Windows Backup-Archive Client Installation and User's Guide	GC32-0788
IBM Tivoli Storage Manager for UNIX Backup-Archive Clients Installation and User's Guide	GC32-0789

Table 1. Related Tivoli Storage Manager publications (continued)

Title	Order Number
IBM Tivoli Storage Manager for Windows Administrator's Guide	GC32-0782
IBM Tivoli Storage Manager for Windows Administrator's Reference	GC32-0783
IBM Tivoli Storage Manager for AIX Administrator's Guide	GC32-0768
IBM Tivoli Storage Manager for AIX Administrator's Reference	GC32-0769
IBM Tivoli Storage Manager for Sun Solaris Administrator's Guide	GC32-0778
IBM Tivoli Storage Manager for Sun Solaris Administrator's Reference	GC32-0779
IBM Tivoli Storage Manager Messages	GC32-0767
IBM Tivoli Storage Manager Using the Application Program Interface	GC32-0793
Tivoli Storage Manager Managed System for SAN Storage Agent User's Guide	GC35-0434

Contacting customer support

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

- Visit the Tivoli Storage Manager technical support Web site at:

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

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

   www.ibm.com/ibmlink

- Submit a problem management record (PMR) electronically at

   www.ibm.com/software/support/probsub.html

- 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 at

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

by selecting the Feedback link in the left navigation bar.

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 2. Typeface conventions

Example	Description
bold	Commands, keywords, authorization roles, or other information that you must use appear in **bold**. <u>Example:</u> Log on to the server as **root** user.
italics	Values or variables that you must provide appear in *italics*. Emphasized words and phrases also appear in *italics*. <u>Example:</u> The node name of the *production node* and *backup node* must not be the same.
bold italics	Options and parameters appear in ***bold italics***. <u>Example:</u> Specify the value for the ***compression*** option.
monospace	Directories, parameters, URLs, and output examples appear in monospace. <u>Example:</u> The product is installed in the /usr/tivoli/tsm/client/ba/bin directory.

Table 2. Typeface conventions (continued)

Example	Description
UPPER CASE	Environment variables associated with Tivoli Storage Manager, operating systems, or Oracle Server appear in UPPER CASE. Example: Make sure the DSM_DIR environment variable is set correctly.

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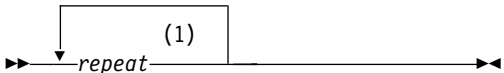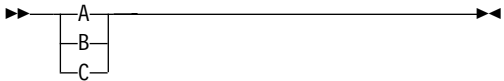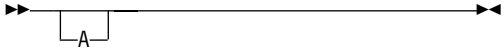
This section describes how to read the syntax diagrams used in this book. To read a syntax diagram, follow the path of the line. Read from left to right, and top to bottom.

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

Syntax Diagram Description	Example

Repetition:

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

```
        ┌──────────┐
        │          │
▶▶──────▼─repeat───┴──────────────────────▶◀
```

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

```
        ┌────,─────┐
        │          │
▶▶──────▼─repeat───┴──────────────────────▶◀
```

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

```
        ┌──────(1)─┐
        │          │
▶▶──────▼─repeat───┴──────────────────────▶◀
```

Notes:

1   Specify *repeat* as many as 5 times.

Required Choices:

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

```
▶▶──┬─A─┬──────────────────────────────────▶◀
    ├─B─┤
    └─C─┘
```

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

Optional Choice:

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

```
▶▶─────────────────────────────────────────▶◀
    └─A─┘
```

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

```
▶▶─────────────────────────────────────────▶◀
    ┌─A─┐
    ├─B─┤
    └─C─┘
```

Defaults:

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

```
    ┌─A─┐
▶▶──┴───┴──────────────────────────────────▶◀
    ├─B─┤
    └─C─┘
```

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

Syntax Diagram Description	Example

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.

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

Syntax Fragments:

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

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

The fragment name:

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

Chapter 1. Introducing Data Protection for Oracle

This section provides a brief overview of Tivoli Storage Manager and Data Protection for Oracle.

Understanding Tivoli Storage Manager

Tivoli Storage Manager is a client/server program that provides storage management services in a multi-vendor, multi-platform computer environment.

Tivoli Storage Manager provides these functions:

- **Reduces network complexity**

  Tivoli Storage Manager reduces network complexity with interfaces and functions that span network environments. This provides consistency across different operating systems and hardware.

- **Increases administrator productivity**

  Tivoli Storage Manager can reduce the cost of network administration by allowing administrators to perform these actions:
  – Automate repetitive processes
  – Schedule unattended processes
  – Administer Tivoli Storage Manager from anywhere in the network

- **Reduces the risk of data loss**

  Many users do not back up their data. Other users apply stand-alone backup techniques with diskettes and tapes as the only protection for business data. These backup systems often produce disappointing results during recovery operations. Tivoli Storage Manager schedules routine backups that enable users to recover from accidental data deletion without administrator involvement.

- **Optimizes existing storage resources**

  Tivoli Storage Manager allows users to move files from client file systems to Tivoli Storage Manager storage. This saves space on client file systems and can eliminate the expense of upgrading client storage hardware.

  Tivoli Storage Manager monitors client storage space and moves files from client file systems to Tivoli Storage Manager storage if an out-of-space condition threatens. This function can also eliminate the expense of client hardware upgrades.

Tivoli Storage Manager provides these services:

- **Backup and restore services**

  These services generate backup copies of data at specified intervals and restores the data from these copies when required. These services protect against workstation or file server media failure, accidental file deletion, data corruption, data vandalism, or site disasters.

- **Archive and retrieve services**

  These services provide backup-archive clients with point-in-time copies of data for long-term storage.

- **Server hierarchical storage management services**

  These services migrate client files from expensive storage media to less expensive storage media (from disk to tape, for example). Administrator-defined thresholds determine file migration for each storage pool. Migration applies to all backup and archive client files.

- **Automation services**

  Tivoli Storage Manager administrators can increase productivity by automating common storage administration tasks.

- **Administration services**

  Tivoli Storage Manager administration services provide support for routine monitoring, administration, and accounting. Administrators can manage the server from another system or the same system. The Tivoli Storage Manager utilities allow the administrator to perform these functions:
  – Set client and server options
  – Define devices
  – Format storage volumes
  – Add additional clients
  – Label tape volumes

  Tivoli Storage Manager monitors scheduled operations and maintains status information in the database. An administrator can export data to removable media. This data can be imported by another server, making the export and import features a convenient utility for moving server data. The administrator can specify the accounting option generated at the end of each client session.

- **Security services**

  Security services control user access to Tivoli Storage Manager data, storage, policy definitions, and administrative commands.

- **Disaster recovery management**

  Disaster recovery management helps the administrator implement a comprehensive backup and recovery procedure for important business applications, data, and records.

Overview of Data Protection for Oracle

Data Protection for Oracle currently supports Oracle8i (8.1.7) and Oracle 9i (9.0.1 or 9.2) databases with the Oracle Recovery Manager (RMAN).

RMAN and Data Protection for Oracle

RMAN provides consistent and secure backup, restore, and recovery performance for Oracle databases. While the Oracle RMAN initiates a backup or restore, Data Protection for Oracle acts as the interface to the Tivoli Storage Manager Server Version 5.1.0 (or later). The Tivoli Storage Manager Server then applies administrator-defined storage management policies to the data. Data Protection for Oracle implements the Oracle defined Media Management application program interface (API) 2.0. This API which interfaces with RMAN and translates Oracle commands into Tivoli Storage Manager API calls to the Tivoli Storage Manager Server.

With the use of RMAN, Data Protection for Oracle allows you to perform the following functions:

- Full backup function for the following while online or offline:
  – Databases

- – Tablespaces
- – Datafiles
- – Archive log files
- – Control files
- Full database restores while offline
- Tablespace and datafile restore while online or offline

LAN-free data transfer

Data Protection for Oracle supports backup and restore operations in a LAN-free environment. This environment shifts the movement of data from the communications network to a storage area network (SAN). Data moves over the SAN to a SAN-attached storage device via the Tivoli Storage Manager Storage Agent. Running Data Protection for Oracle in a LAN-free environment avoids constraints of the network and decreases the load on the Tivoli Storage Manager Server, allowing the server to support a greater number of simultaneous connections.

Migration and coexistence

- Data Protection for Oracle Version 5.2 does not support Oracle8 (8.0.x) databases.
- Existing backups created using Data Protection for Oracle Version 2.2.0 and 2.2.1 are restorable using Data Protection for Oracle 5.2.
- Data Protection for Oracle relies heavily on the tdpo.opt file for accuracy in setup and maintenance. The contents of the tdpo.opt file are different than the environment variables used with Data Protection for Oracle Version 2.1. Therefore, Version 2.1 RMAN scripts for environment variables are ignored. For more information, see Chapter 3, "Configuring Data Protection for Oracle", on page 25 or "Scripts" on page 33.
- Tivoli Storage Manager Server Version 5.1.0 (or later) and the Tivoli Storage Manager API Version 5.1.5 (or later) are supported.

Chapter 2. Installing Data Protection for Oracle

This chapter provides information on the required client environment for Data Protection for Oracle and instructions on installing Data Protection for Oracle.

Make sure these conditions exist before installing Data Protection for Oracle:
- Tivoli Storage Manager Server Version 5.1.0 (or later) is configured.
- Tivoli Storage Manager API Version 5.1.5 (or later) is installed. This version of the Tivoli Storage Manager API is included in the Data Protection for Oracle product media.

Attention: A *root* user must install the Tivoli Storage Manager API before installing Data Protection for Oracle on the workstation where the target database resides.

After Data Protection for Oracle is installed, you must perform the following configuration tasks:
1. Define Data Protection for Oracle options in the tdpo.opt file.
2. Register the Data Protection for Oracle node to a Tivoli Storage Manager Server.
3. Define Tivoli Storage Manager options in the dsm.opt and dsm.sys files.
4. Define Tivoli Storage Manager policy requirements.
5. Initialize the password with a Tivoli Storage Manager Server.

See Chapter 3, "Configuring Data Protection for Oracle", on page 25 for detailed task instructions.

Note: If you would like to configure Data Protection for Oracle using default settings, see Appendix A, "Quick start guide", on page 45 for instructions.

Important

See the README.TDPO file that is shipped on the product installation media for the most current information.

AIX 32-bit environment

This section contains operating system, hardware, software, and communication requirements for installing Data Protection for Oracle on an AIX 32-bit operating system.

Operating system requirements

- AIX 4.3.3 32-bit

Hardware requirements

- Any RS/6000 or pSeries workstation
- Disk space: 6 MB
- Memory: 96 MB

Software requirements

- Tivoli Storage Manager Server Version 5.1.0 (or later)
- Tivoli Storage Manager API Version 5.1.5 (or later)
- One of the following levels of Oracle Server:
  - Oracle8i Version 8.1.7
  - Oracle9i Version 9.0.1

Communication methods

- TCP/IP
- Shared memory

   Note: See "Configuring shared memory" on page 8 for information on how to set up shared memory with Data Protection for Oracle.

Installing Data Protection for Oracle on AIX 32-bit

All installables reside under the /cdrom/tsmcli/aix32/ directory.

Table 3. AIX 32-bit Default Installation Directories

AIX	Default Installation Directories
Data Protection for Oracle 32-bit	/usr/tivoli/tsm/client/oracle/bin
Data Protection for Oracle Utilities	/usr/tivoli/tsm/client/oracle/bin
Tivoli Storage Manager API 32-bit	/usr/tivoli/tsm/client/api/bin

Table 4. Data Protection for Oracle 32-bit, Utilities, Messages, and Tivoli Storage Manager API Package Names

Package	Package Name
Data Protection for Oracle 32-bit	tivoli.tsm.client.oracle.32bit
Data Protection for Oracle Utilities	tivoli.tsm.client.oracle.tools.32bit
Data Protection for Oracle Messages	tivoli.tsm.client.oracle.msg.32bit.*xx_XX*
Tivoli Storage Manager API 32-bit	tivoli.tsm.client.api.32bit

Follow these instructions to install Data Protection for Oracle. This example assumes that your CD-ROM drive is **/dev/cd0**.

1. Insert the CD-ROM containing the client package into the CD-ROM drive.
2. Log in as the *root* user.
3. Enter **smitty install** at the command prompt.
4. Select **Install and Update Software**. Press **Enter**.
5. Select **Install and Update from LATEST Available Software**. Press **Enter**.
6. Enter **/dev/cd0** in the Entry Field for **INPUT device / directory for software**. Press **Enter**.
7. Highlight the **SOFTWARE to install** option. Press **F4** to list available software.
8. Select the installable packages by performing the following:
   a. Highlight the Data Protection for Oracle package (tivoli.tsm.client.oracle.32bit) and press **F7**.
   b. Highlight the Data Protection for Oracle utilities package (tivoli.tsm.client.oracle.tools.32bit) and press **F7**.
   c. Highlight the Tivoli Storage Manager API package (tivoli.tsm.client.api.32bit) and press **F7**.
   d. Highlight the Data Protection for Oracle messages package (tivoli.tsm.client.oracle.msg.32bit.*xx_XX*) and press **F7**.

   After all four packages are selected, press **Enter**.
9. When the **Install and Update from LATEST Available Software** window displays, press **Enter**.
10. A window displays and prompts you with this message:

    ARE YOU SURE?

    Press **Enter** to continue the installation procedure.

11. After successfully installing Data Protection for Oracle, press **F10** to exit the **smitty install** environment. You can view the **Summary** for more information regarding the installation.

Note: If you receive errors when attempting to perform a backup, you may need to relink Oracle8i (Version 8.1.7) RMAN with Data Protection for Oracle. See "Relinking RMAN and Data Protection for Oracle" on page 37 for detailed instructions.

Configuring shared memory

In order to use shared memory with Data Protection for Oracle, the Tivoli Storage Manager Server and Data Protection for Oracle must be installed on the same workstation. Perform the following to configure shared memory with Data Protection for Oracle:

- In the dsm.sys server stanza, edit the Tivoli Storage Manager Server option, *commmethod*, and add the *shmport* option:

```
Servername tsmserver
commmethod sharedmem
shmport     1510
```

If you restore oracle datafiles backed up through the shared memory communication method, *root* authority becomes the owner of these oracle datafiles. Use the **tdpoconf** utility to confirm that shared memory is configured properly. See *Tivoli Storage Manager Administrator's Reference* for more information on configuring the shared memory communication method.

AIX 4.3.3 64-bit environment

This section contains operating system, hardware, software, and communication requirements for installing Data Protection for Oracle on an AIX 4.3.3 64-bit operating system.

Operating system requirements
- AIX 4.3.3 64-bit

Hardware requirements
- Any RS/6000 or pSeries workstation
- Disk space: 6 MB
- Memory: 96 MB

Software requirements
- Tivoli Storage Manager Server Version 5.1.0 (or later)
- Tivoli Storage Manager API Version 5.1.5 (or later)
- One of the following levels of Oracle Server:
  - Oracle8i Version 8.1.7
  - Oracle9i Version 9.0.1

Communication methods
- TCP/IP

Installing Data Protection for Oracle on AIX 64-bit

All installables reside under the `/cdrom/tsmcli/aix64/` directory.

Table 5. AIX 64-bit Default Installation Directories

AIX	Default Installation Directories
Data Protection for Oracle 64-bit	/usr/tivoli/tsm/client/oracle/bin64
Data Protection for Oracle Utilities	/usr/tivoli/tsm/client/oracle/bin64
Tivoli Storage Manager API 64-bit	/usr/tivoli/tsm/client/api/bin64

Table 6. Data Protection for Oracle 64-bit, Utilities, Messages, and Tivoli Storage Manager API Package Names

Package	Package Name
Data Protection for Oracle 64-bit	tivoli.tsm.client.oracle.64bit
Data Protection for Oracle Utilities	tivoli.tsm.client.oracle.tools.64bit
Data Protection for Oracle Messages	tivoli.tsm.client.oracle.msg.64bit.*xx_XX*
Tivoli Storage Manager API 64-bit	tivoli.tsm.client.api.64bit

Follow these instructions to install Data Protection for Oracle. This example assumes that your CD-ROM drive is **/dev/cd0**.

1. Insert the CD-ROM containing the client package into the CD-ROM drive.
2. Log in as the *root* user.
3. Enter **smitty install** at the command prompt.
4. Select **Install and Update Software**. Press **Enter**.
5. Select **Install and Update from LATEST Available Software**. Press **Enter**.
6. Enter **/dev/cd0** in the Entry Field for **INPUT device / directory for software**. Press **Enter**.
7. Highlight the **SOFTWARE to install** option. Press **F4** to list available software.
8. Select the installable packages by performing the following:
   a. Highlight the Data Protection for Oracle package (`tivoli.tsm.client.oracle.64bit`) and press **F7**.
   b. Highlight the Data Protection for Oracle utilities package (`tivoli.tsm.client.oracle.tools.64bit`) and press **F7**.
   c. Highlight the Tivoli Storage Manager API package (`tivoli.tsm.client.api.64bit`) and press **F7**.
   d. Highlight the Data Protection for Oracle messages package (`tivoli.tsm.client.oracle.msg.64bit.xx_XX`) and press **F7**.

   After all four packages are selected, press **Enter**.
9. When the **Install and Update from LATEST Available Software** window displays, press **Enter**.
10. A window displays and prompts you with this message:
    ```
    ARE YOU SURE?
    ```

    Press **Enter** to continue the installation procedure.

11. After successfully installing Data Protection for Oracle, press **F10** to exit the **smitty install** environment. You can view the **Summary** for more information regarding the installation.

Note: If you receive errors when attempting to perform a backup, you may need to relink Oracle8i (Version 8.1.7) RMAN with Data Protection for Oracle. See "Relinking RMAN and Data Protection for Oracle" on page 37 for detailed instructions.

AIX 5.1 64-bit environment

This section contains operating system, hardware, software, and communication requirements for installing Data Protection for Oracle on an AIX 5.1 64-bit operating system.

Operating system requirements
- AIX 5L (Version 5.1 64-bit)

Hardware requirements
- Any RS/6000 or pSeries workstation
- Disk space: 6 MB
- Memory: 96 MB

Software requirements
- Tivoli Storage Manager Server Version 5.1.0 (or later)
- Tivoli Storage Manager API Version 5.1.5 (or later)
- Oracle9i Version 9.2

Communication methods
- TCP/IP

Installing Data Protection for Oracle on AIX 5.1 64-bit

All installables reside under the `/cdrom/tsmcli/aix64/` directory.

Table 7. AIX 64-bit Default Installation Directories

AIX	Default Installation Directories
Data Protection for Oracle 64-bit	/usr/tivoli/tsm/client/oracle/bin64
Data Protection for Oracle Utilities	/usr/tivoli/tsm/client/oracle/bin64
Tivoli Storage Manager API 64-bit	/usr/tivoli/tsm/client/api/bin64

Table 8. Data Protection for Oracle 64-bit, Utilities, Messages, and Tivoli Storage Manager API Package Names

Package	Package Name
Data Protection for Oracle 64-bit	tivoli.tsm.client.oracle.64bit
Data Protection for Oracle Utilities	tivoli.tsm.client.oracle.tools.64bit
Data Protection for Oracle Messages	tivoli.tsm.client.oracle.msg.aix51.64bit.*xx_XX*
Tivoli Storage Manager API 64-bit	tivoli.tsm.client.api.64bit

Follow these instructions to install Data Protection for Oracle. This example assumes that your CD-ROM drive is **/dev/cd0**.

1. Insert the CD-ROM containing the client package into the CD-ROM drive.
2. Log in as the *root* user.
3. Enter **smitty install** at the command prompt.
4. Select **Install and Update Software**. Press **Enter**.
5. Select **Install and Update from LATEST Available Software**. Press **Enter**.
6. Enter **/dev/cd0** in the Entry Field for **INPUT device / directory for software**. Press **Enter**.
7. Highlight the **SOFTWARE to install** option. Press **F4** to list available software.
8. Select the installable packages by performing the following:
    a. Highlight the Data Protection for Oracle package (`tivoli.tsm.client.oracle.64bit`) and press **F7**.
    b. Highlight the Data Protection for Oracle utilities package (`tivoli.tsm.client.oracle.tools.64bit`) and press **F7**.
    c. Highlight the Tivoli Storage Manager API package (`tivoli.tsm.client.api.64bit`) and press **F7**.
    d. Highlight the Data Protection for Oracle messages package (`tivoli.tsm.client.oracle.msg.aix51.64bit.`*xx_XX*) and press **F7**.

    After all four packages are selected, press **Enter**.
9. When the **Install and Update from LATEST Available Software** window displays, press **Enter**. Data Protection for Oracle prompts you to accept the License Agreement. If you do not accept the License Agreement, Data Protection for Oracle will not install.

10. A window displays and prompts you with this message:

   ```
   ARE YOU SURE?
   ```

   Press **Enter** to continue the installation procedure.
11. After successfully installing Data Protection for Oracle, press **F10** to exit the **smitty install** environment. You can view the **Summary** for more information regarding the installation.
12. Relink Oracle Version 9.2 RMAN with Data Protection for Oracle by performing the following steps:

   a. Set the Oracle LD_LIBRARY_PATH option to specify `$ORACLE_HOME/lib` as the first entry:

   ```
   LD_LIBRARY_PATH=$ORACLE_HOME/lib
   ```

   b. Shut down all Oracle instances that use `$ORACLE_HOME`.

   c. Go to the `$ORACLE_HOME/lib` directory.

   d. Symbolically link the library file to *libobk.a*:

   ```
   $ ln -s /usr/lib/libobk64.a $ORACLE_HOME/lib/libobk.a
   ```

   e. Start the Oracle instances.

HP-UX 32-bit environment

This section contains operating system, hardware, software, and communication requirements for installing Data Protection for Oracle on an HP-UX 32-bit operating system.

Operating system requirements

One of the following levels of HP-UX operating system:
- HP-UX 11
- HP-UX 11i

Hardware requirements

- Any HP 9000 Series 700 or 800 workstation
- Disk space: 6 MB
- Memory: 96 MB

Software requirements

- Tivoli Storage Manager Server Version 5.1.0 (or later)
- Tivoli Storage Manager API Version 5.1.5 (or later)
- One of the following levels of Oracle Server:
  - Oracle8i Version 8.1.7
  - Oracle9i Version 9.0.1

Communication methods

- TCP/IP

Installing Data Protection for Oracle on HP-UX 32-bit

All installables reside under the /cdrom/tsmcli/hp32/ directory.

Table 9. HP-UX 32-bit Default Installation Directories

HP-UX	Default Installation Directories
Data Protection for Oracle 32-bit	/opt/tivoli/tsm/client/oracle/bin
Data Protection for Oracle Utilities	/opt/tivoli/tsm/client/oracle/bin
Data Protection for Oracle Messages	/opt/tivoli/tsm/client/oracle/bin
Tivoli Storage Manager API	/opt/tivoli/tsm/client/api/bin

Table 10. Data Protection for Oracle 32-bit and Tivoli Storage Manager API Package Information

Product	Installable	Package(s)
Data Protection for Oracle 32-bit	TDPOracle	TDPOracle.TDPOracle TDPOracle.TDPOlic TDPOracle.TDPOutil
Data Protection for Oracle Messages	TDPOracle.msg	TDPOracle.msg.*xx_XX*
Tivoli Storage Manager API	TIVsmCapi	TIVsm.CLIENT_API

Data Protection for Oracle uses the **swinstall** program to install.

To install:
1. Log in as the *root* user:

   ```
   # su
   Password:
   ```

   Enter your password.
2. Create a directory for mounting the CD-ROM. Set the appropriate permission to the directory:

   ```
   # mkdir /cdrom
   # chmod 755 /cdrom
   ```
3. Insert the CD-ROM into the CD-ROM drive and mount the CD-ROM:

   ```
   # mount -r -F hsfs <device_name> /cdrom
   ```

   Enter your ***device_name*** for the CD-ROM in this command. An example of ***device_name*** is /dev/dsk/c1t2d0.
4. Issue this command to install the Tivoli Storage Manager API:

   ```
   swinstall -v -s /cdrom/tsmcli/hp32/TIVsmCapi
   ```
5. Issue this command to install the Data Protection for Oracle product, utilities, and license:

   ```
   swinstall -v -s /cdrom/tsmcli/hp32/TDPOracle
   ```
6. Issue this command to install the Data Protection for Oracle messages:

   ```
   swinstall -v -s /cdrom/tsmcli/hp32/TDPOracle.msg.xx_XX
   ```

Note: If you receive errors when attempting to perform a backup, you may need to relink Oracle8i (Version 8.1.7) RMAN with Data Protection for Oracle. See "Relinking RMAN and Data Protection for Oracle" on page 37 for detailed instructions.

HP-UX 64-bit environment

This section contains operating system, hardware, software, and communication requirements for installing Data Protection for Oracle on an HP-UX 64-bit operating system.

Operating system requirements

One of the following levels of HP-UX operating system:

- HP-UX 11
- HP-UX 11i

Hardware requirements

- Any HP 9000 Series 700 or 800 workstation
- Disk space: 6 MB
- Memory: 96 MB

Software requirements

- Tivoli Storage Manager Server Version 5.1.0 (or later)
- Tivoli Storage Manager API Version 5.1.5 (or later)
- One of the following levels of Oracle Server:
  - Oracle8i Version 8.1.7
  - Oracle9i Version 9.0.1
  - Oracle9i Version 9.2

Communication methods

- TCP/IP

Installing Data Protection for Oracle on HP-UX 64-bit

All installables reside under the `/cdrom/tsmcli/hp64/` directory.

Table 11. HP-UX 64-bit Default Installation Directories

HP-UX	Default Installation Directories
Data Protection for Oracle 64-bit	/opt/tivoli/tsm/client/oracle/bin64
Data Protection for Oracle Utilities	/opt/tivoli/tsm/client/oracle/bin64
Data Protection for Oracle Messages	/opt/tivoli/tsm/client/oracle/bin64
Tivoli Storage Manager API	/opt/tivoli/tsm/client/api/bin64

Table 12. Data Protection for Oracle 64-bit and Tivoli Storage Manager API Package Information

Product	Installable	Package(s)
Data Protection for Oracle 64-bit	TDPOracle64	TDPOracle64.TDPOracle64 TDPOracle64.TDPOlic TDPOracle64.TDPOutil
Data Protection for Oracle Messages	TDPOracle64.msg	TDPOracle64.msg.*xx_XX*
Tivoli Storage Manager API	TIVsmCapi64	TIVsm64.CLIENT_API64

Data Protection for Oracle uses the **swinstall** program to install.

To install:
1. Log in as the *root* user:

   ```
   # su
   Password:
   ```

   Enter your password.
2. Create a directory for mounting the CD-ROM. Set the appropriate permission to the directory:

   ```
   # mkdir /cdrom
   # chmod 755 /cdrom
   ```
3. Insert the CD-ROM into the CD-ROM reader and mount the CD-ROM:

   ```
   # mount -r -F hsfs <device_name> /cdrom
   ```

   Enter your ***device_name*** for the CD-ROM in this command. An example of ***device_name*** is `/dev/dsk/c1t2d0`.
4. Issue this command to install the Tivoli Storage Manager API:

   ```
   swinstall -v -s /cdrom/tsmcli/hp64/TIVsmCapi64
   ```
5. Issue this command to install the Data Protection for Oracle product, utilities, and license:

   ```
   swinstall -v -s /cdrom/tsmcli/hp64/TDPOracle64
   ```
6. Issue this command to install the Data Protection for Oracle messages:

   ```
   swinstall -v -s /cdrom/tsmcli/hp64/TDPOracle64.msg
   ```

Note: If you receive errors when attempting to perform a backup, you may need to relink Oracle8i (Version 8.1.7) RMAN with Data Protection for Oracle. See "Relinking RMAN and Data Protection for Oracle" on page 37 for detailed instructions.

Linux

Linux 32-bit environment

This section contains operating system, hardware, software, and communication requirements for installing Data Protection for Oracle on a Linux 32-bit operating system.

Operating system requirements

One of the following levels of Linux operating system:

- SuSE SLES7
- Red Hat 2.1 Advanced Server

Hardware requirements

- Any Intel x86 32-bit workstation
- Disk space: 6 MB
- Memory: 96 MB

Software requirements

- Tivoli Storage Manager Server Version 5.1.0 (or later)
- Tivoli Storage Manager API Version 5.1.5 (or later)
- Oracle 9i Version 9.2

Communication methods

- TCP/IP

Installing Data Protection for Oracle on Linux 32-bit

All installables reside under the /cdrom/tsmcli/lnx/ directory.

Table 13. Linux 32-bit Default Installation Directories

Linux	Default Installation Directories
Data Protection for Oracle 32-bit	/opt/tivoli/tsm/client/oracle/bin
Data Protection for Oracle Utilities	/opt/tivoli/tsm/client/oracle/bin
Data Protection for Oracle Messages	/opt/tivoli/tsm/client/oracle/bin
Tivoli Storage Manager API 32-bit	/opt/tivoli/tsm/client/api/bin

Table 14. Data Protection for Oracle 32-bit, Utilities, Messages, and Tivoli Storage Manager API Package Names

Package	Package Name
Data Protection for Oracle 32-bit	TDP-Oracle.i386.rpm
Data Protection for Oracle Utilities	TDP-Oracle.Utility-5.2.0-0.i386.rpm
Data Protection for Oracle Messages	TDP-Oracle.msg.*xx_XX*-5.2.0-0.i386.rpm
Tivoli Storage Manager API 32-bit	TIVsm-API.i386.rpm

This installation procedure is designed to install directly from the Data Protection for Oracle CD-ROM:

1. Log in as the *root* user.
2. Mount the Data Protection for Oracle CD-ROM to /cdrom:

   ```
   mount <device name> /cdrom
   ```
3. Change to the /cdrom/tsmcli/lnx directory where the installation packages reside on the CD-ROM:

   ```
   /cdrom/tsmcli/lnx
   ```
4. Enter the following command to install the Tivoli Storage Manager API:

   ```
   rpm -i TIVsm-API.i386.rpm
   ```
5. Enter the following command to install Data Protection for Oracle:

   ```
   rpm -i --nodeps TDP-Oracle.i386.rpm
   ```
6. Enter the following command to install Data Protection for Oracle messages:

   ```
   rpm -i --nodeps TDP-Oracle.msg.xx_XX-5.2.0-0.i386.rpm
   ```

Solaris

Solaris 32-bit environment

This section contains operating system, hardware, software, and communication requirements for installing Data Protection for Oracle on a Solaris 32-bit operating system.

Operating system requirements
One of the following levels of Solaris operating system:

- Solaris 2.6
- Solaris 7
- Solaris 8
- Solaris 9

Hardware requirements

- A SPARC 32-bit or compatible workstation
- Disk space: 6 MB
- Memory: 96 MB

Software requirements

- Tivoli Storage Manager Server Version 5.1.0 (or later)
- Tivoli Storage Manager API Version 5.1.5 (or later)
- One of the following levels of Oracle Server:
  - Oracle8i Version 8.1.7
  - Oracle9i Version 9.0.1
  - Oracle9i Version 9.2

Communication method

- TCP/IP

Installing Data Protection for Oracle on Solaris 32-bit

All installables reside under the `/cdrom/tsmcli/sol32/` directory.

Table 15. Solaris 32-bit Default Installation Directories

Solaris	Default Installation Directories
Data Protection for Oracle 32-bit	/opt/tivoli/tsm/client/oracle/bin
Data Protection for Oracle Utilities	/opt/tivoli/tsm/client/oracle/bin
Data Protection for Oracle Messages	/opt/tivoli/tsm/client/oracle/bin
Tivoli Storage Manager API 32-bit	/opt/tivoli/tsm/client/api/bin

Table 16. Data Protection for Oracle 32-bit and Tivoli Storage Manager API Package Information

Product	Installable	Package(s)
Data Protection for Oracle 32-bit	TDPoracle32.pkg	TDPOrc32, TDPOLic32 TDPOUt32
Data Protection for Oracle Messages	TDPO32*xx*.pkg	TDPO32*xx*
Tivoli Storage Manager API 32-bit	TIVsmCapi32.pkg	TIVsmCapi

Perform these instructions to install the Tivoli Storage Manager API, Data Protection for Oracle, and the Data Protection for Oracle license package. This example assumes that your CD-ROM drive is **/cdrom** and that you are installing the Data Protection for Oracle 32-bit product.

1. Insert the CD-ROM containing the package into the CD-ROM drive.
2. Log in as the *root* user.
3. Issue this command to install the Tivoli Storage Manager API:

   ```
   $ pkgadd -d /cdrom/tsmcli/sol32/TIVsmCapi32.pkg
   ```
4. Issue this command to install Data Protection for Oracle and the Data Protection for Oracle license:

   ```
   $ pkgadd -d /cdrom/tsmcli/sol32/TDPoracle32.pkg
   ```
5. Issue this command to install Data Protection for Oracle messages:

   ```
   $ pkgadd -d /cdrom/tsmcli/sol32/TDPO32xx.pkg
   ```

Note: If you receive errors when attempting to perform a backup, you may need to relink Oracle8i (Version 8.1.7) RMAN with Data Protection for Oracle. See "Relinking RMAN and Data Protection for Oracle" on page 37 for detailed instructions.

Solaris 64-bit environment

This section contains operating system, hardware, software, and communication requirements for installing Data Protection for Oracle on a Solaris 64-bit operating system.

Operating system requirements

One of the following levels of Solaris operating system:

- Solaris 7
- Solaris 8
- Solaris 9

Hardware requirements

- A SPARC 64-bit or compatible workstation
- Disk space: 6 MB
- Memory: 96 MB

Software requirements

- Tivoli Storage Manager Server Version 5.1.0 (or later)
- Tivoli Storage Manager API Version 5.1.5 (or later)
- One of the following levels of Oracle Server:
  - Oracle8i Version 8.1.7
  - Oracle9i Version 9.0.1
  - Oracle9i Version 9.2 (on Solaris 8 operating system only)

Communication methods

- TCP/IP

Installing Data Protection for Oracle on Solaris 64-bit

All installables reside under the /cdrom/tsmcli/sol64/ directory.

Table 17. Solaris 64-bit Default Installation Directories

Solaris	Default Installation Directories
Data Protection for Oracle 64-bit	/opt/tivoli/tsm/client/oracle/bin64
Data Protection for Oracle Utilities	/opt/tivoli/tsm/client/oracle/bin64
Data Protection for Oracle Messages	/opt/tivoli/tsm/client/oracle/bin64
Tivoli Storage Manager API 64-bit	/opt/tivoli/tsm/client/api/bin64

Table 18. Data Protection for Oracle 64-bit and Tivoli Storage Manager API Package Information

Product	Installable	Package(s)
Data Protection for Oracle 64-bit	TDPoracle64.pkg	TDPOrc64, TDPOLic64 TDPOUt64
Data Protection for Oracle Messages	TDPO64*xx*.pkg	TDPO64*xx*
Tivoli Storage Manager API 64-bit	TIVsmCapi64.pkg	TIVsmCapi

Perform these instructions to install the Tivoli Storage Manager API, Data Protection for Oracle, and the Data Protection for Oracle license package. This example assumes that your CD-ROM drive is **/cdrom** and that you are installing the Data Protection for Oracle 64-bit product.

1. Insert the CD-ROM containing the client package into the CD-ROM drive.
2. Log in as the *root* user.
3. Issue this command to install the Tivoli Storage Manager API:

   ```
   $ pkgadd -d /cdrom/tsmcli/sol64/TIVsmCapi64.pkg
   ```
4. Issue this command to install Data Protection for Oracle and the Data Protection for Oracle license:

   ```
   $ pkgadd -d /cdrom/tsmcli/sol64/TDPoracle64.pkg
   ```
5. Issue this command to install Data Protection for Oracle messages:

   ```
   $ pkgadd -d /cdrom/tsmcli/sol64/TDPoracle64xx.pkg
   ```

Note: If you receive errors when attempting to perform a backup, you may need to relink Oracle8i (Version 8.1.7) RMAN with Data Protection for Oracle. See "Relinking RMAN and Data Protection for Oracle" on page 37 for detailed instructions.

Chapter 3. Configuring Data Protection for Oracle

After Data Protection for Oracle is successfully installed, you must complete the following configuration tasks:
1. Define Data Protection for Oracle options in the tdpo.opt file.
2. Register the Data Protection for Oracle node to a Tivoli Storage Manager Server.
3. Define Tivoli Storage Manager options in the dsm.opt and dsm.sys files.
4. Define Tivoli Storage Manager policy requirements.
5. Initialize the password with a Tivoli Storage Manager Server.

Note: If you would like to configure Data Protection for Oracle using default settings, see Appendix A, "Quick start guide", on page 45 for instructions.

1. Define Data Protection for Oracle options in the tdpo.opt file

The Data Protection for Oracle options file, tdpo.opt, contains options that determine the behavior and performance of Data Protection for Oracle. The *only* environment variable Data Protection for Oracle Version 5.2 recognizes within an RMAN script is the fully qualified path name to the tdpo.opt file. Therefore, some RMAN scripts may need to be edited to use *tdpo_optfile=fully qualified path and file name of options file* variable in place of other environment variables. For example:

```
allocate channel t1 type 'sbt_tape' parms
        'ENV=(tdpo_optfile=/home/rman/scripts/tdpo.opt)'
```

See "Scripts" on page 33 for further information.

If a fully qualified path name is not provided, Data Protection for Oracle uses the tdpo.opt file located in the Data Protection for Oracle default installation directory. If this file does not exist, Data Protection for Oracle proceeds with default values.

Considerations
- It is strongly recommended that you use the tdpo.opt file exclusively instead of default parameters.
- RMAN and the **tdpoconf** and **tdposync** utilities use the options defined in the tdpo.opt file.
- By default, the tdpo.opt file is located in the directory where Data Protection for Oracle is installed.
- Data Protection for Oracle supports options specified in upper case or lower case type.

Available options

The following options can be set in the tdpo.opt file:

dsmi_log
> Specify the directory that contains the Data Protection for Oracle error log file (tdpoerror.log).
>
> For error log files, create a directory for the error logs and have the *dsmi_log* option point to that directory. The user performing backups must have writable rights to this directory.

dsmi_orc_config
> Specify the complete path to the Tivoli Storage Manager backup-archive client user options file (dsm.opt) used during the Data Protection for Oracle session. If you do not specify this option, Data Protection for Oracle looks for this options file in the Data Protection for Oracle installation directory. You must specify this option if your Tivoli Storage Manager client user options file is located in a directory other than the Data Protection for Oracle installation directory.

tdpo_fs
> Specify a file space name on the Tivoli Storage Manager Server for Data Protection for Oracle backup, delete, and restore operations. The file space name can contain a string of *1* to *1024* characters.
> - The default file space name is *adsmorc*.
> - When you have more than one Oracle database, use this option to back up each Oracle target database to its own file space.
> - Do not use a directory delimiter in front of the filespace name when setting up this option.
> - If this option was set during Data Protection for Oracle backup operations, this option *must* be set during restore and delete operations.
> - If you have more than one Oracle database, back up each Oracle target database to its own file space on the Tivoli Storage Manager Server.
> - The file space name in the include/exclude statement must match the file space name specified in the **tdpo_fs** option for include/exclude processing to function correctly.

tdpo_node
> Specify the Data Protection for Oracle node name used during operations with the Tivoli Storage Manager Server. The node name can contain a string of *1* to *64* characters.
> - The default value is the value returned by the UNIX **hostname** command.
> - Data Protection for Oracle does not use the node name value specified in the dsm.sys file.
> - It is recommended that you use a node name that is different from the machine name on which Data Protection for Oracle is installed.
>
> To restore data from one Oracle server to another Oracle server using Data Protection for Oracle, make sure the value of the **tdpo_node** option in the tdpo.opt file on the target Oracle server equals the value of the **tdpo_node** option in the tdpo.opt file on the source Oracle server. Data Protection for Oracle, the Tivoli Storage Manager backup-archive client, and the Tivoli Storage Manager API must be at the same levels on both the source Oracle server and the target Oracle server. If there is a password associated with the **tdpo_node** option in the tdpo.opt file on the target Oracle server, use the **tdpoconf** utility to generate the local password file once the value of the **tdpo_node** option changes.

tdpo_owner
> This option specifies a session-owner name and object owner name. The value can contain a string of 1 to 64 characters. The default value is the value returned by the UNIX **id** command.

tdpo_pswdpath
> This option specifies the directory where the TDPO.nodename password file is located. The default value is the directory where Data Protection for Oracle is installed.

tdpo_date_fmt
> This option specifies the format you want to use to display dates. You can specify a number between *0* and *5* inclusively. The default value is *1*.
>
> **0** Use the locale-specified date format.
>
> **1** MM/DD/YYYY (Default)
>
> **2** DD-MM-YYYY
>
> **3** YYYY-MM-DD
>
> **4** DD.MM.YYYY
>
> **5** YYYY.MM.DD

tdpo_num_fmt
> This option specifies the format you want to use to display numbers. You can specify a number between *1* and *6* inclusively. The default value is *1*.
>
> **1** 1,000.00 (Default)
>
> **2** 1,000,00
>
> **3** 1 000,00
>
> **4** 1 000.00
>
> **5** 1.000,00
>
> **6** 1'000,00

tdpo_time_fmt
> This option specifies the format you want to use to display time. You can specify a number between *0* and *4* inclusively. The default value is *1*.
>
> **0** Use the locale-specified time format.
>
> **1** 23:00:00 (Default)
>
> **2** 23,00,00
>
> **3** 23.00.00
>
> **4** 12:00:00 A/P

tdpo_mgmt_class_2
> This option specifies the second management class used for copy 2 in the RMAN duplex copy command.

tdpo_mgmt_class_3
> This option specifies the third management class used for copy 3 in the RMAN duplex copy command.

tdpo_mgmt_class_4
> This option specifies the fourth management class used for copy 4 in the RMAN duplex copy command. Four copies is the maximum allowed by RMAN.

Note: It is recommended that you review "Using the Duplex Copy function" on page 34 for specific details on using management class options.

2. Register the Data Protection for Oracle node to a Tivoli Storage Manager Server

The Data Protection for Oracle node name and password (if required) must be registered to the Tivoli Storage Manager Server before you can begin requesting backup and restore services. The process of setting up a node name and password with the Tivoli Storage Manager Server is called *registration*.

The following information is needed to register Data Protection for Oracle with the Tivoli Storage Manager Server:

- The Data Protection for Oracle node name

  This is the node name that identifies the workstation on which Data Protection for Oracle is installed. It is recommended that you use a separate and unique node name for Data Protection for Oracle. This prevents any confusion with an existing Tivoli Storage Manager backup-archive client on the same workstation.

- The initial password

  This is the password you want to use, if a password is required.

The following information is defined by the Tivoli Storage Manager administrator:

- The policy domain to which your client node belongs.

  A policy domain contains policy sets and management classes that control how Tivoli Storage Manager manages the objects you back up. Rather than binding Data Protection for Oracle backups to a different management class, it is recommended that a unique policy domain be defined for Data Protection for Oracle node names. These backups can be bound to the default management class within this unique policy domain. Rather than binding a different management class for Oracle backups, it is also recommended that you specify a different domain for Oracle backups with a separate management class.

- The authority to enable compression.

  The Data Protection for Oracle node can only compress objects before sending them to the Tivoli Storage Manager Server if the Tivoli Storage Manager administrator leaves the compression decision to the node.

- The authority to delete backup data from Tivoli Storage Manager storage.

  The Data Protection for Oracle node can only delete backed up data from Tivoli Storage Manager storage if the Tivoli Storage Manager administrator registers the node with backdelete authority. Specify the following option to allow backdelete authority:

  > *backdelete=yes*

  The copy group of the management class to which Oracle backups are bound must also have the following option settings for backdelete authority to function:

  > *verdeleted=0*
  > *retonly=0*

3. Define Tivoli Storage Manager options in the dsm.opt and dsm.sys files

You must define some Tivoli Storage Manager options after the Data Protection for Oracle node is registered to the Tivoli Storage Manager Server:

- These options are defined in the Tivoli Storage Manager client system options file (dsm.sys by default) and client user options file (dsm.opt by default).
- Please note that the Tivoli Storage Manager client user options file (dsm.opt by default) you must edit for Data Protection for Oracle is located in the directory specified by the ***dsmi_orc_config*** option. If this option is not specified, Data Protection for Oracle looks for this options file in the Data Protection for Oracle installation directory.
- The Tivoli Storage Manager client system options file (dsm.sys by default) must be located in the directory where the Tivoli Storage Manager API is installed.
- Data Protection for Oracle provides sample Tivoli Storage Manager options files that you can modify for this purpose. These sample files are located in the Data Protection for Oracle installation directory.
- The Tivoli Storage Manager administrator can provide you with the node name, password, and communication method for connecting Data Protection for Oracle to the Tivoli Storage Manager Server.

Required options

Specify these options in the Tivoli Storage Manager client system options file (dsm.sys by default) located in the directory where the Tivoli Storage Manager API is installed:

passwordaccess
> Specify whether you want to generate your password automatically or set as a user prompt. You must specify ***passwordaccess*** *prompt* for Data Protection for Oracle to function. The default value is *prompt*. A *generate* setting uses the Trusted Communication Agent (TCA). However, Oracle prevents Data Protection for Oracle from starting a child process, such as TCA. Therefore, you must specify *prompt* in a UNIX environment.(Data Protection for Oracle installed in a Windows environment requires ***passwordaccess*** *generate*)

servername
> Specify the name you want to use to identify a Tivoli Storage Manager Server and to begin a stanza containing options for that server.

commmethod
> Specify the communication method for Data Protection for Oracle to communicate with the Tivoli Storage Manager Server. Please note that this option requires other Tivoli Storage Manager options, depending on the communication method you specify.

Specify this option in the Tivoli Storage Manager client user options file (dsm.opt by default) located in the directory specified by the ***dsmi_orc_config*** option:

servername
> Specify a Tivoli Storage Manager Server that is named in your client system options file (dsm.sys by default) to contact for Data Protection for Oracle backup services.

Other options to consider

It is recommended that you specify these options in the Tivoli Storage Manager client system options file, dsm.sys:

compression

Specify whether the Tivoli Storage Manager API compresses data before sending it to the Tivoli Storage Manager Server. You can specify *on* or *off*. The default value is *on*. The value of the compression option for Data Protection for Oracle is honored only if the Tivoli Storage Manager administrator leaves the compression decision to the node. Enabling compression affects performance in three ways:

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

Considerations: It is recommended that you specify *on* when any of the following conditions exist:

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

It is recommended that you specify *off* when any of the following conditions exist:

- The machine running Data Protection for Oracle has a CPU overload. The added CPU usage (as a result of enabling compression) can impact other applications, including the Oracle server.
- You are not constrained by network bandwidth. In this case, you can achieve the best performance by specifying **compression** *off* and enabling hardware compaction on the tape drive, which also reduces storage requirements.

Note: The **compression** option also accepts these values: *true, false, yes, no.*

enablelanfree

Specify whether you run backup operations in a LAN-free environment if you are equipped to do so. You can specify *yes* or *no*. The default value is *no*. You can avoid network constraints by shifting the movement of data to a storage area network (SAN). For more information, see the appropriate *Managed System for SAN Storage Agent User's Guide* for your operating environment.

4. Define Tivoli Storage Manager policy requirements

RMAN uses the **format** parameter (in the RMAN script) to generates unique backup file names. Because all backup objects inserted into the Tivoli Storage Manager backup storage pool have unique file names, they never expire on the Tivoli Storage Manager Server. As a result, Data Protection for Oracle requires these special Tivoli Storage Manager policy domain settings:

Backup copy group values

Data Protection for Oracle provides the **tdposync** utility to remove

unwanted backup objects from the Tivoli Storage Manager Server. The following Tivoli Storage Manager backup copy group options must be set:

- *verdeleted=0*
- *retonly=0*

Then, when Data Protection for Oracle marks a backup object inactive, that object is deleted from the Tivoli Storage Manager Server the next time expiration processing occurs. A backup object is marked inactive when you delete it through RMAN using the Data Protection for Oracle interface or with the **tdposync** utility.

Notes:

1. The Tivoli Storage Manager administrator must also register your node by specifying *backdelete=yes* in order for backup objects to be deleted.

2. The following backup copy group options are not applicable to Data Protection for Oracle:
   - *frequency*
   - *verexists*
   - *retextra*
   - *mode*
   - *serialization*

   Data Protection for Oracle accepts default values for these options.

3. Be aware that the RMAN **crosscheck** command will expire backups on the Tivoli Storage Manager Server that belong to a different Tivoli Storage Manager node or file space.

Management class

Tivoli Storage Manager uses management classes to manage backups on the Tivoli Storage Manager Server. When you back up a database, the default management class for your node is used. Because the policy requirements for Data Protection for Oracle may be different from the desired settings for the regular Tivoli Storage Manager backup-archive clients, you must have a different management class defined for Data Protection for Oracle. It is recommended that you define a separate policy domain where the default management class has the required settings and then register all Data Protection for Oracle nodes to that domain.

If you choose to define a new management class within an existing policy domain (not the default management class for that domain), then you must add an *include* statement to the Data Protection for Oracle options file to bind all objects to that management class.

The following steps assign a management class name *orcbackup* to all Oracle backups with a default file space name *adsmorc*:

1. Add this *inclexcl* entry under the server stanza you use in the dsm.sys file:

   ```
   inclexcl /u01/oracle/include.def
   ```

2. Add this *include* entry to the /u01/oracle/include.def file:

   ```
   include /adsmorc/.../* orcbackup
   ```

   Note: The file space name in the include/exclude statement must match the file space name defined with the *tdpo_fs* option. If a file space name other than the default value (*adsmorc*) is used:

   a. You must specify the file space name with the *tdpo_fs* option.

   b. You must specify the file space name defined in the *tdpo_fs* option in the include/exclude statement.

All the files backed up with a default file space name of *adsmorc* are assigned to management class *orcbackup*.

Note: Data Protection for Oracle stores all objects as backup objects on Tivoli Storage Manager storage, so an archive copy group is not required, although it can exist.

See your Tivoli Storage Manager administrator or see *Tivoli Storage Manager Administrator's Guide* for more information on defining or updating Tivoli Storage Manager policy domains and copy groups.

5. Initialize the password with a Tivoli Storage Manager Server

The administrator must run the **tdpoconf** utility program to set the password before using Data Protection for Oracle. See "TDPOCONF" on page 39 for more information.

Chapter 4. Using RMAN and Data Protection for Oracle

You can perform full or partial, offline or online backups with Oracle. Once you identify which database to back up, Oracle locates all necessary files and sends them to the Tivoli Storage Manager Server through Data Protection for Oracle. As a result, Data Protection for Oracle provides an interface between Oracle Media Management API calls and Tivoli Storage Manager API routines.

Invoking RMAN

Invoke RMAN to back up and restore an Oracle database. In this example, the catalog database contains a registered target database. Invoke RMAN with this command:

```
$>  rman target xxx/yyy@target rcvcat aaa/bbb@catalog
  cmdfile bkdb.scr msglog bkdb.log
```

This starts RMAN in the sequence shown.

```
target xxx/yyy@target: connect to target database
using user xxx and password yyy with connect string target
rcvcat aaa/bbb@catalog: connect to catalog database
using user aaa and password bbb with connect string catalog
cmdfile bkdb.scr:  run bkdb.scr script
msglog bkdb.log:  log the output messages in bkdb.log
```

Note: In the above example, RMAN creates a log file (bkdb.log) in the current working directory. If an error occurs, you will see the error stack in the log file.

Scripts

Data Protection for Oracle does not recognize environment variables specified in an RMAN script. The *only* environment variable Data Protection for Oracle Version 5.2 recognizes within an RMAN script is the fully qualified path name to the tdpo.opt file. Therefore, existing RMAN scripts may need to be edited to use ***tdpo_optfile**=fully qualified path and file name of options file* variable in place of other environment variables.

Example

This backup script allocates two parallel connections to the Tivoli Storage Manager Server. The Tivoli Storage Manager Server views these connections as two separate sessions:

```
run
{
   allocate channel t1 type 'sbt_tape' parms
           'ENV=(tdpo_optfile=/ora81/scripts/tdpo.opt)';
   allocate channel t2 type 'sbt_tape' parms
           'ENV=(tdpo_optfile=/ora81/scripts/tdpo.opt)';

   backup
      filesperset 5
      format 'df_%t_%s_%p'
      (database);

   }
```

Note: To back up to Tivoli Storage Manager using Data Protection for Oracle, you *must* specify type 'sbt_tape' in the RMAN script.

This restore script allocates one parallel connection to the Tivoli Storage Manager Server:

```
run
{
allocate channel t1 type 'sbt_tape' parms 'ENV=(tdpo_optfile=/home/oracle/tdpo.opt)';
restore database;
recover database;
alter database open;
}
```

Note: The Oracle database must be in mount mode for the restore to succeed.

Using the Duplex Copy function

For example, to create four backup copies:

1. Specify the following option in the RMAN backup script:

   ```
   set duplex 4
   ```

2. Define the following options in the tdpo.opt file:
   * *tdpo_mgmt_class_2*
   * *tdpo_mgmt_class_3*
   * *tdpo_mgmt_class_4*
3. Run the RMAN backup script.

The following backup behavior occurs:
* The first backup copy is bound to the default management class to which the node is registered.
* The second backup copy is bound to the management class defined by the *tdpo_mgmt_class_2* option.
* The third backup copy is bound to the management class defined by the *tdpo_mgmt_class_3* option.
* The fourth backup copy is bound to the management class defined by the *tdpo_mgmt_class_4* option.

Considerations

When using the duplex copy feature, make sure that no *include* options are defined for Oracle backups.

You will receive an error message if you specify *set duplex 4* in the RMAN backup script and do not define a sufficient number of *tdpo_mgmt_class* options in the tdpo.opt file.

In order to place duplicate copies on different media:
- Make sure the storage pool information for each backup copy group within the management classes is not the same.
- Make sure backups from these different storage pools are not migrated to the same storage pool at a later time.

Be aware that duplicate data will be sent across the network.

Be aware that if you specify *set duplex 4* and allocate *one* channel in the RMAN backup script, RMAN will start *four* sessions to the Tivoli Storage Manager Server. Likewise, if you specify *set duplex 4* and allocate *two* channels in the RMAN backup script, RMAN will start *eight* sessions to the Tivoli Storage Manager Server.

Make sure RMAN does not start more sessions than the maximum mount points allowed by the Tivoli Storage Manager Server. The Tivoli Storage

Manager Server option, ***maxnummp***, determines the maximum number of mount points a client node is allowed to use on the Tivoli Storage Manager Server during a backup operation. You can view the maximum mount points allowed by the Tivoli Storage Manager Server for a particular node by entering the **query node** command from a Tivoli Storage Manager Administrative Client prompt:

```
q node f=d
```

See the appropriate *Tivoli Storage Manager Administrator's Reference* for more information regarding this option.

It is highly recommended that you review your current Oracle documentation regarding the Duplex backup function.

Removing old backups

Data Protection for Oracle uses the Tivoli Storage Manager backup repository. Each database backup creates a new object with a unique name. Since these objects have unique names, they always remain active and never expire. This allows the Database Administrator (DBA) to control and coordinate copies removed from the Tivoli Storage Manager Server with RMAN.

Be aware that the RMAN **crosscheck** command will expire backups on the Tivoli Storage Manager Server that belong to a different Tivoli Storage Manager node or file space.

Note: Make sure to use the same tdpo.opt file that was used for the original backup. This enables the backup objects to be found on the Tivoli Storage Manager Server.

Example

To remove an old backup, issue this command from the RMAN prompt:

```
run
{
   allocate channel for delete type 'sbt_tape' parms
           'ENV=(tdpo_optfile=/orc81/scripts/tdpo.opt)';

   change backupset backupset number delete;

}
```

See the Oracle RMAN manual for more information on the **change** command and its options.

Management class options affecting object removal

Use parameters in the Management Class definition to control when the inactive object expires on the Tivoli Storage Manager Server.

For the backup copy group, use:
- ***verdeleted=0***
- ***retonly=0***

This erases the inactive objects from the server after the next inventory expiration.

In order to delete backup objects, the Tivoli Storage Manager administrator must register your node by specifying **backdelete**=*yes*.

Reporting problems

If you encounter a problem while using Data Protection for Oracle or if you cannot start Data Protection for Oracle, do the following:

1. Run the **tdpoconf** utility **showenvironment** command to collect information on your options file (*–tdpo_optfile*=) and specified output files (*–outfile*=).
2. If the above command ran successfully, check its output to see if the setup worked as expected.
3. If the above command failed, check the tdpoerror.log and dsierror.log files. The tdpoerror.log is a log file created in the installation directory by default. The dsierror.log is generated by the Tivoli Storage Manager API when a problem occurs with the Tivoli Storage Manager API setup.
4. Fix the problem and run the **tdpoconf** utility again.
5. If the problem persists, gather the following information:
   - A problem description file that includes the command you used and the session output you received when the problem occurred.
   - The tdpo.opt file
   - The dsm.opt file
   - The tdpoerror.log file
   - The dsierror.log file
   - The RMAN log file
   - The Tivoli Storage Manager API trace file

     To generate the Tivoli Storage Manager API trace file, add the following lines in your dsm.opt file:

     ```
     tracefile /home/oracle/rman/tsmapi.out
     traceflag service
     ```

   - The node information on the Tivoli Storage Manager Server. To obtain this information, enter:

     ```
     query node <nodename> format=detail
     ```

   - The Tivoli Storage Manager Server activity log. To obtain this information, enter this Tivoli Storage Manager administrator command:

     ```
     query actlog
     ```

   - The Data Protection for Oracle trace file

     To generate the Data Protection for Oracle trace file, add the following lines in your tdpo.opt file:

     ```
     tdpo_trace_flags orclevel0 orclevel1 orclevel2
     tdpo_trace_file /home/oracle/rman/tdpo.out
     ```

     where:

     orclevel0
     > Traces out function exit points when errors occur.

     orclevel1
     > Traces out normal function entry and exit points.

     orclevel2
     > Traces out more detailed information.

> **Note:** Any path and file name can be specified for the *tdpo_trace_file* and *tracefile* options. However, the directory must exist and have writable rights.

Relinking RMAN and Data Protection for Oracle

You may need to relink Oracle8i (Version 8.1.7) RMAN with Data Protection for Oracle if you receive errors when attempting to perform a backup. Due to inconsistencies among levels and operating systems of Oracle Server, it is strongly recommended that you review the most current Oracle documentation for detailed information on how to relink with Media Management libraries *before* performing the steps documented in this section.

AIX 32-bit: Relink Oracle8i (Version 8.1.7) RMAN with Data Protection for Oracle by performing the following steps:

1. Shut down all Oracle instances that use

   `$ORACLE_HOME`
2. Go to the `$ORACLE_HOME/lib` directory.
3. Remove the *libobk.a* symbolic link:

   `$ rm $ORACLE_HOME/lib/libobk.a`
4. Symbolically link the library file to *libobk.a*:

   `$ ln -s /usr/lib/libobk.a $ORACLE_HOME/lib/libobk.a`
5. Start the Oracle instances.

AIX 4.3.3 64-bit Relink Oracle8i (Version 8.1.7) RMAN with Data Protection for Oracle by performing the following steps:

1. Shut down all Oracle instances that use

   `$ORACLE_HOME`
2. Go to the `$ORACLE_HOME/lib64` directory.
3. Remove the *libobk.a* symbolic link:

   `$ rm $ORACLE_HOME/lib64/libobk.a`
4. Symbolically link the library file to *libobk.a*:

   `$ ln -s /usr/lib/libobk.a $ORACLE_HOME/lib64/libobk.a`
5. Start the Oracle instances.

HP-UX 32-bit Relink Oracle8i (Version 8.1.7) RMAN with Data Protection for Oracle by performing the following steps:

1. Shut down all Oracle instances that use

   `$ORACLE_HOME`
2. Go to the `$ORACLE_HOME/lib` directory.
3. Remove the *libobk.sl* symbolic link:

   `$ rm $ORACLE_HOME/lib/libobk.sl`
4. Symbolically link the library file to *libobk.sl*:

   `$ ln -s /usr/lib/libobk.sl $ORACLE_HOME/lib/libobk.sl`
5. Start the Oracle instances.

HP-UX 64-bit Relink Oracle8i (Version 8.1.7) RMAN with Data Protection for Oracle by performing the following steps:

1. Shut down all Oracle instances that use

   `$ORACLE_HOME`
2. Go to the `$ORACLE_HOME/lib64` directory.
3. Remove the *libobk.sl* symbolic link:

   `$ rm $ORACLE_HOME/lib64/libobk.sl`

4. Symbolically link the library file to *libobk.sl*:

   ```
   $ ln -s /usr/lib/pa20_64/libobk.sl $ORACLE_HOME/lib64/libobk.sl
   ```
5. Start the Oracle instances.

Solaris 32-bit Relink Oracle8i (Version 8.1.7) RMAN with Data Protection for Oracle by performing the following steps:
1. Shut down all Oracle instances that use

   ```
   $ORACLE_HOME
   ```
2. Go to the $ORACLE_HOME/lib directory.
3. Remove the *libobk.so* symbolic link:

   ```
   $ rm $ORACLE_HOME/lib/libobk.so
   ```
4. Symbolically link the library file to *libobk.so*:

   ```
   $ ln -s /usr/lib/libobk.so $ORACLE_HOME/lib/libobk.so
   ```
5. Start the Oracle instances.

Solaris 64-bit Relink Oracle8i (Version 8.1.7) RMAN with Data Protection for Oracle by performing the following steps:
1. Shut down all Oracle instances that use

   ```
   $ORACLE_HOME
   ```
2. Go to the $ORACLE_HOME/lib64 directory.
3. Remove the *libobk.so* symbolic link:

   ```
   $ rm $ORACLE_HOME/lib64/libobk.so
   ```
4. Symbolically link the library file to *libobk.so*:

   ```
   $ ln -s /usr/lib/sparcv9/libobk.so $ORACLE_HOME/lib64/libobk.so
   ```
5. Start the Oracle instances.

Requesting Tivoli Storage Manager service

If you need Tivoli Storage Manager customer assistance, call 1-800-IBM-SERV (1-800-426-7378). Inform the customer service representative that you are using Data Protection for Oracle. To help determine the problem, provide the customer service representative with the following information:
- The operating system platform, version, and release level of the machine on which your Tivoli Storage Manager Server product is installed.
- The version and release level of your Tivoli Storage Manager Server product. Enter the **query status** command to determine this information. For example:

  ```
  query status
  ```
- The operating system platform, version, and release level of the machine on which your Data Protection for Oracle product is installed.
- The version and release level of your Data Protection for Oracle product. You can locate this in the readme file. You can also enter the **what /usr/lib/libobk.a** command on AIX or the **what /usr/lib/libobk.so** command on Solaris.

Chapter 5. Using the utilities

This chapter describes how to use the Data Protection for Oracle utilities (**tdpoconf** and **tdposync**) from the command line interface. These utilities are located in the directory where Data Protection for Oracle is installed.

- The **tdpoconf** utility is used for password maintenance and general Data Protection for Oracle setup and maintenance.
- The **tdposync** utility is used to delete the Oracle backups on the Tivoli Storage Manager Server which are not in the RMAN catalog. This occurs when backups have inadvertently not been deleted from the Tivoli Storage Manager Server.

Command line syntax and characteristics

The Data Protection for Oracle utilities use the following command line syntax:

```
tdpoconf <command> <0 or more optional parameters>
tdposync <command> <0 or more optional parameters>
```

The command line parameters have the following characteristics:
- Minimum abbreviations for keywords are indicated in upper case.
- Optional parameters begin with a dash (-).
- Optional parameters can appear in any order.
- Some keyword parameters require a value separated by the equal sign (=).
- If a parameter requires more than one value, the values are separated with commas.
- A space separates the invocation from the command and the command from any optional parameters.
- Each parameter is separated from others by a space.
- If a parameter value includes spaces, the entire parameter must be enclosed in double quotes.

TDPOCONF

This utility provides setup tasks to ease the configuration of Data Protection for Oracle. The utility uses the tdpo.opt file in the installation directory to centralize information for setup purposes.

Two commands are available using the **tdpoconf** utility:
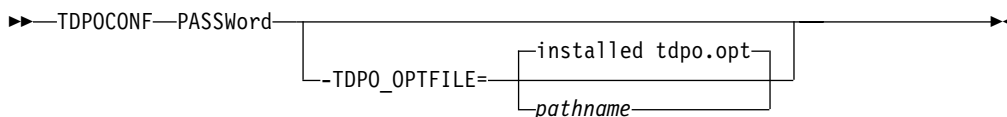- **PASSWord**
- **SHOWENVironment**

A description of these two commands and their parameters follows.

Password command

Use the **password** command to create a new password or change an existing password on the Tivoli Storage Manager Server. You are prompted to enter both the old and new passwords when you invoke this utility.

This command creates an encrypted password file, *TDPO.Nodename*. This file is located in the directory specified by the ***tdpo_pswdpath*** option. If the

tdpo_pswdpath option is not specified, the *TDPO.Nodename* file is placed in the Data Protection for Oracle installation directory

Syntax

```
►►──TDPOCONF──PASSWord───────────────────────────────────────────────────►◄
                          │                    ┌─installed tdpo.opt─┐      │
                          └─TDPO_OPTFILE=───────┤                    ├──────┘
                                                └─pathname───────────┘
```

Optional parameters

-**TDPO_OPTFILE=***pathname*
> This parameter specifies the fully qualified path name to the tdpo.opt file. If you choose not to specify this option, the default path is used.

Example
This is an output example of the **tdpoconf password** command:

```
****************************************************************
*         Tivoli Data Protection for Oracle Utility           *
*  Password file initialization/update program                *
*      ROOT privilege needed to update value                  *
****************************************************************

Please enter current password:

Please enter new password:

Please reenter new password for verification:

ANS0260I Password successfully changed.
```

Showenvironment command

Use the **showenvironment** command to query the Tivoli Storage Manager Server using the options set in *–tdpo_optfile*, the tdpo.opt file in the default installation directory, or the default values set by Data Protection for Oracle. The screen output displays information about the Tivoli Storage Manager API and Tivoli Storage Manager Server. This command is useful when troubleshooting Data Protection for Oracle setup. If, for example, the password file is not initialized properly, **tdpoconf showenvironment** reports this error immediately and prevents complications that can arise if this error were to go undetected.

Note: For initial setup, it is recommended that you direct the output to a file with the *–outfile* option to ensure that the desired environment is set correctly before using RMAN.

Syntax
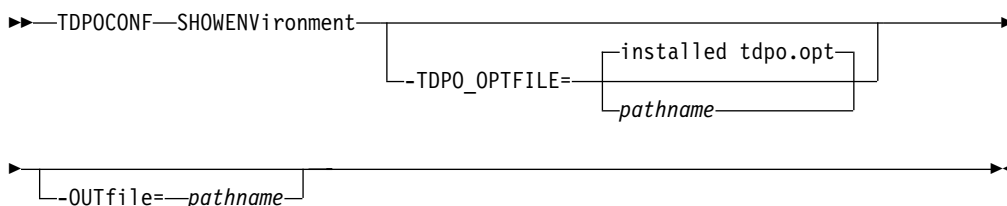
```
►►──TDPOCONF──SHOWENVironment─────────────────────────────────────────────►
                              │                    ┌─installed tdpo.opt─┐  │
                              └─TDPO_OPTFILE=───────┤                    ├──┘
                                                    └─pathname───────────┘

►─────────────────────────────────────────────────────────────────────────►◄
   └─OUTfile=──pathname─┘
```

Optional parameters

-**TDPO_OPTFILE=***pathname*
>This parameter specifies the fully qualified path name to the tdpo.opt file. This is the options file that is used by the utilities and the Data Protection for Oracle library.

-**OUTfile=***pathname*
>This parameter specifies the fully qualified path name to the output file. The formatted text of this file is the same content that appears as output to the screen.

Example
Below is an output example of the **tdpoconf showenvironment** command:

```
DATA PROTECTION FOR ORACLE INFORMATION
  Version:             5
  Release:             2
  Level:               0
  Sublevel:            0
  Platform:            32bit TDPO Linux86

TSM SERVER INFORMATION
  Server Name:         TSMSERVER
  Server Type:         AIX-RS/6000
  Server Address:      SERVER.MYSITE.COMPANY.COM
  Server Port:         1500
  Communication Method: TCP/IP

SESSION INFORMATION
  Owner Name:          oracle8
  Node Name:           AGENT_NODE
  Node Type:           TDPO Linux86
  DSMI_DIR:            /opt/tivoli/tsm/client/api/bin
  DSMI_ORC_CONFIG:     /opt/tivoli/tsm/client/api/bin/dsm.opt
  TDPO_OPTFILE:        /opt/tivoli/tsm/client/oracle/bin/tdpo.opt
  Password Directory:  /opt/tivoli/tsm/client/oracle/bin
  Compression:         TRUE
```

Note: The `Server Name:` value above identifies the Tivoli Storage Manager Server *stanza* in the dsm.sys file, not the actual name of the Tivoli Storage Manager Server.

TDPOSYNC

Attention: Deleted files cannot be restored! When using this utility to delete files, ensure that you do not log on under the wrong node name, query a different database than intended, and delete files in error. Double-check the node name listed at the top of the PICK window. See "Optional parameters" on page 43 and "PICK Window" on page 44 for further details.

The **tdposync** utility checks for items on the Tivoli Storage Manager Server that are not in the RMAN catalog. This utility allows you to repair such discrepancies between the Tivoli Storage Manager Server and the RMAN catalog. By thus removing unwanted objects in Tivoli Storage Manager storage, you can reclaim space on the server.

When an RMAN deletion script is run, RMAN deletes entries in the recovery catalog before confirmation from the Tivoli Storage Manager Server. In cases where objects are not found on the Tivoli Storage Manager Server, RMAN tries to delete backup sets from the Tivoli Storage Manager Server and fails. When this happens,

RMAN can no longer identify these backups through the catalog even though the file still exists on the Tivoli Storage Manager Server. This utility therefore synchronizes the contents of the servers.

When you invoke **tdposync**, the utility does the following:
1. Prompts you for information
2. Gathers information for the Oracle server(s)
3. Queries the Oracle backup catalog and the Tivoli Storage Manager Server
4. Displays formatted output to the screen (files that exist on Tivoli Storage Manager but not in the RMAN catalog)
5. Prompts you to do *one* of the following:
   - Delete any files found causing the discrepancy.
   - Delete all files.
   - Exit the program without deleting files from the Tivoli Storage Manager Server.

Considerations

The following information must be considered before using the **tdposync** command:

- Re-synchronize Oracle catalogs with the target databases before running the **tdposync syncdb** command. First, connect to the target database and the catalog database. The following is an example:

  ```
  $ rman target xxx/yyy@targetdb  rcvcat xxx/yyy@catalogdb
  ```

  When you are connected to both databases, type **resync catalog** at the RMAN prompt.
- If the information for **sqlplus** that you provide to **tdposync** is incorrect (such as logon, password, or connect string information), **sqlplus** stops at its logon screen. You will need to log on again at the prompt using the following:

  ```
  login/password@connectstring
  ```

  When you enter the correct input, **tdposync** proceeds correctly.
- By default, Data Protection for Oracle prompts you to synchronize with one Oracle catalog at a time. However, if you use multiple Oracle catalogs to back up multiple target databases to the same file space, the same node name, and the same owner name on the same Tivoli Storage Manager Server, you must use –*numcatalogs*=*number*. This is necessary so that **tdposync** has all the information to correctly query both Oracle and Tivoli Storage Manager. For more information , see "Optional parameters" on page 43.

  Attention: Failure to provide all pertinent and correct information can result in erroneous output. To prevent this, see the next consideration.
- If you have more than one Oracle database, back up each Oracle target database to its own file space on the Tivoli Storage Manager Server. To do this, use the *tdpo_fs* option in the tdpo.opt file. In addition, it is highly recommended that you use a separate Data Protection for Oracle options file for *each* database that you back up to Tivoli Storage Manager. In this way, it is only necessary to synchronize one catalog at a time (once for each target database), thus minimizing the display of wrong information in the PICK window.
- Make sure to use the same tdpo.opt file that was used for the original backup.
- Be aware that the RMAN **crosscheck** command will expire backups on the Tivoli Storage Manager Server that belong to a different Tivoli Storage Manager node or file space.

Syncdb Command

This is the only command available to **tdposync** utility.

Syntax
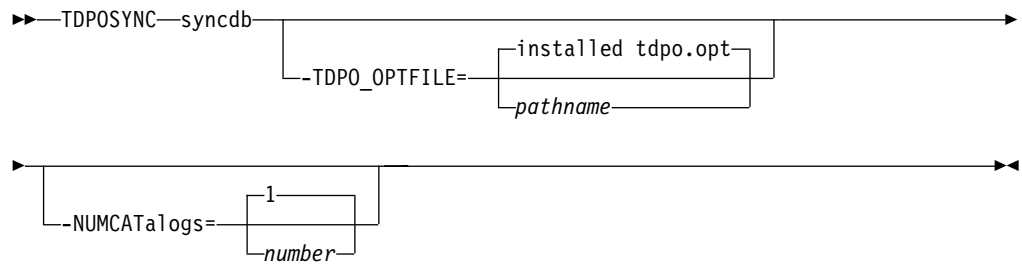
```
►►──TDPOSYNC──syncdb──────────────────────────────────────────────────────────►
                      │                       ┌──installed tdpo.opt──┐      │
                      └─-TDPO_OPTFILE=─┬──────────────────────────────┬─┘
                                      └─pathname──────────────────────┘

►──────────────────────────────────────────────────────────────────────────►◄
   │                        ┌──1───────┐  │
   └─-NUMCATalogs=─┬────────────────────┬─┘
                   └─number─────────────┘
```

Optional parameters

-TDPO_OPTFILE=_pathname_

> This parameter specifies the fully qualified path name to the tdpo.opt file. This is the options file that is used by the utilities and the Data Protection for Oracle library. This file contains the information for the Tivoli Storage Manager Server name and address that **tdposync** needs for synchronizing.
>
> **Note:** For **syncdb** _tdpo_optfile_, you must specify the same options file values that were used to perform the original backup operations.

-NUMCATalogs=_number_

> This parameter specifies the number of Oracle catalog databases that you want to synchronize and prompts you for information for each catalog that exists on your node. Specify this option only when you use _multiple_ Oracle catalogs to back up multiple target databases to the same Tivoli Storage Manager Server under the same file space, node name, and owner name.
>
> If, for example, you back up only _one_ target database using two catalogs, you _do not_ need to specify this option. However, if you back up _two_ target databases using two catalogs (one catalog for each) to the same Tivoli Storage Manager Server under the same file space, node name, and owner name, you must specify **numcatalogs**. If you fail to provide information for the second target database (by not specifying two catalogs), that database will be displayed as eligible for deletion.
>
> According to the number you specify for -**numcatalogs**, you are prompted for the user name, password, and connect string for each. If you do not specify -**numcatalogs**, the default is 1, and you are prompted only once.

For each catalog, you are prompted for the following information:
- Catalog # User Name:
- Catalog # Password:
- Catalog # Connect String:

You are also prompted for the following date information to narrow your search:
- From Date: (MM/DD/YYYY)
- To Date: (MM/DD/YYYY)

Example

This is an output example of the **tdposync syncdb** command:

```
Catalog 1 User Name: rman

Catalog 1 Password: rman

Catalog 1 Connect String: rman


From Date (MM/DD/YYYY): 01/01/2000

To Date (MM/DD/YYYY): 01/01/2001
```

PICK Window

The PICK window provides the following useful information to help you decide if the files displayed are indeed out of synchronization with the Oracle catalog:
- The node with which you are querying the Tivoli Storage Manager Server
- The date of the file backup
- The size of the backup
- The backup name (/fs//backup file name)

Attention: Use caution when selecting files for deletion. If you are unsure that the files in question are really out of synchronization, do further research before deleting them. Once you delete files, they *cannot* be restored.

Example: This is an example output of the PICK window:

```
Node Name: AGENT_NODE
  Owner Name: oracle8


           Backup Date          Size        Backup Name
          -------------------------------------------------------------
    1. |  02/26/2001  09:19:59     108.01MB    /adsmorc//1kc2cnfv_1_1
    2. |  02/19/2001  11:36:20      56.25MB    /adsmorc//4kc3cnfv_1_1
    3. |  02/19/2001  07:14:30     102.00MB    /adsmorc//4qcgdhfr_1_1
    4. |  02/19/2001  07:21:38      78.10MB    /adsmorc//4ocf8999_1_1
    5. |  02/26/2001  11:00:11      10.99MB    /adsmorc//4ocf8999_1_2
    6. |  02/26/2001  11:00:12      32.07MB    /adsmorc//4ocf8999_1_3
    7. |  02/26/2001  11:00:13     623.90MB    /adsmorc//4rch25jk_1_1
    8. |  02/26/2001  11:00:14     441.61MB    /adsmorc//4rch25jk_1_2
    9. |  02/26/2001  11:00:15      10.18MB    /adsmorc//4rch25jk_1_3
       |
       |
       |
       |
       |
       |
       0--------10-------20-------30-------40-------50-------60-------70
<U>=Up  =Down  <T>=Top  <B>=Bottom  <R>=Right  <L#>=Left
<G#>=Goto Line #  <#>=Toggle Entry  <+>=Select All  <->=Deselect All
<#:#+>=Select A Range <#:#->=Deselect A Range  <O>=Ok  <C>=Cancel
pick>
```

Files selected for deletion are marked by a plus (+). To delete selected files:
1. Enter **OK** at the PICK prompt.

   A warning message appears to confirm deletion of the selected files.
2. Enter **Yes** to delete the selected files from the Tivoli Storage Manager Server.

IMPORTANT! The deletion process is irreversible. Use caution when selecting files for deletion.

Appendix A. Quick start guide

This section provides instructions on how to perform a quick configuration of Data Protection for Oracle on an AIX 32-bit machine. This procedure uses default settings and requires minimal configuration tasks. It minimizes set up time and allows you to proceed quickly to a state where you can begin backing up your Oracle databases. Note that you must change the installation paths and library extensions documented in this procedure if you are using an operating system other than AIX 32-bit. See page 25 for detailed instructions on how to customize Data Protection for Oracle for your environment and processing needs.

1. Install Data Protection for Oracle.
   - Detailed installation instructions are available on page 5.
2. Make sure the following link exists:

   ```
   $ORACLE_HOME/lib/libobk.a -> /usr/lib/libobk.a
   ```

   - Oracle 8.1.7 may need the library file relinked to Oracle. Detailed relinking instructions are available on page 37.
3. Change to the /usr/tivoli/tsm/client/oracle/bin directory and copy the *tdpo.opt.smp* file to *tdpo.opt*. Edit the tdpo.opt file to include these options:

   ```
   dsmi_orc_config /usr/tivoli/tsm/client/oracle/bin/dsm.opt
   dsmi_log /usr/tivoli/tsm/client/oracle/bin
   tdpo_node hostname_oracle
   ```

   Replace *hostname* with the hostname of the machine.
   - More information about these options is available on page 25.
4. In this same directory, create a dsm.opt file. Edit the dsm.opt file to include the following server stanza:

   ```
   SErvername tdpo
   ```

   - More information about this option and the dsm.opt file is available on page 29.
5. Change to the /usr/tivoli/tsm/client/api/bin directory and create a symbolic link to /usr/tivoli/tsm/client/ba/bin/dsm.sys. Edit the dsm.sys file to include the following options:

   ```
   SErvername tdpo
   COMMMethod TCPip
   TCPServeraddress x.x.x.x
   PASSWORDAccess prompt
   ```

   Replace *x.x.x.x* with the IP address of the Tivoli Storage Manager Server to which Data Protection for Oracle will back up data.
   - More information about the dsm.sys file, these options, and their relationship with Data Protection for Oracle is available on page 29.
6. Register the node (specified in Step 3) to the Tivoli Storage Manager Server with the following command:

   ```
   REG NODE hostname_oracle password maxnummp=2 passexp=0
   ```

Where *hostname* is the name of the machine where Data Protection for Oracle is installed and *password* is the password for this node.

7. Make sure the Oracle user has the following permissions:

   - Read, Write, and Execute (rwx) permission to the `/usr/tivoli/tsm/client/oracle/bin` and `/usr/tivoli/tsm/client/api/bin` directories.

   - Read permission (r-) to the tdpo.opt, dsm.opt, and dsm.sys files located in the `/usr/tivoli/tsm/client/oracle/bin` and `/usr/tivoli/tsm/client/api/bin` directories.

8. Change to the `/usr/tivoli/tsm/client/oracle/bin` directory and run the **tdpoconf password** command to generate the password file. You will be prompted to enter the password (from Step 6) three times.

   - More information about this command is available on page 39.

9. Run the **tdpoconf showenvironment** command to confirm proper configuration.

   - More information about this command is available on page 40.

10. As Oracle user, run your RMAN backup script with the ENV=(*tdpo_optfile*=/usr/tivoli/tsm/client/oracle/bin/tdpo.opt) parameter specified.

    For example:

    ```
    run
    {
        allocate channel t1 type 'sbt_tape' parms
                'ENV=(tdpo_optfile=/usr/tivoli/tsm/client/oracle/bin/tdpo.opt)';

        backup
            filesperset 5
            format 'df_%t_%s_%p'
            (database);

    }
    ```

    - More information about RMAN backup scripts is available on page 33.

Appendix B. Using the Tivoli Storage Manager scheduler

This section describes how to use the Tivoli Storage Manager scheduler with Data Protection for Oracle to automate online backups of Oracle server databases. The example illustrates the use of the Tivoli Storage Manager Version 5.1 backup-archive client scheduler.

Considerations

The Tivoli Storage Manager backup–archive client must reside on the same machine as Data Protection for Oracle for the Tivoli Storage Manager scheduler to function.

After Data Protection for Oracle has been registered to a Tivoli Storage Manager Server and installed on the Oracle server, perform these steps:
1. On the Tivoli Storage Manager Server:
   a. Define a schedule to perform an AIX, HP-UX, Linux, or Solaris command file in the policy domain to which Data Protection for Oracle is registered.
   b. Associate the Data Protection for Oracle node to the defined schedule.
2. On the machine where Data Protection for Oracle is installed:

   a. Create a single dsm.sys file from which to associate nodes for your client, Data Protection for Oracle, and scheduled backups.

   b. Create a scheduler backup script. An example script is provided.

   c. Start the scheduler.

Setting up a schedule

For consistency, this procedure uses specific information. However, you can define a command file with any set of commands you choose. This allows you to use the same command file to define schedules on other Tivoli Storage Manager Servers. All command information is presented as command-line interface entries.

This schedule in this procedure contains the following settings:
- The Data Protection for Oracle node name is *NodeA1*.
- The password for node name *NodeA1* is *PasswordA1*.
- The policy domain to which node name *NodeA1* is registered is *PolicyA1*.
- The schedule is a daily backup of an online Oracle database.
- The scheduled backup begins between 9:00 and 9:15 PM.

Part I: On the Tivoli Storage Manager Server

1. Define the following schedule on the Tivoli Storage Manager Server. You can enter the command on the Tivoli Storage Manager Server console or on an Administrative Client. The Administrative Client does not have to be running on the same system as the Tivoli Storage Manager Server.

   ```
   define schedule PolicyA1 daily_orcbkup description="08Daily Online DB Backup"
   action=command objects="/usr/tivoli/tsm/client/oracle/sched/schedbkdb.scr"
   starttime=21:00 duration=15 durunits=minutes period=1 perunits=day
   dayofweek=any
   ```

   The following message must display before proceeding to Step 2:

   ```
   ANR2500I Schedule daily_orcbkup defined in policy domain PolicyA1.
   ```

2. Issue the following command to associate the Data Protection for Oracle node to the backup schedule defined in Step 1:

```
define association PolicyA1 daily_orcbkup NodeA1
```

The following message must display before proceeding to Part II:

```
ANR2510I Node NodeA1 associated with schedule orc_dailybkup
         in policy domain PolicyA1.
```

Summary:
- A backup schedule is now defined on the Tivoli Storage Manager Server.
- The backup schedule will run an RMAN backup command script (bkdb.scr) located in the `/home/oracle/sched` directory.
- The backup is performed once a day around 9:00 PM.
- The backup schedule can start on any day of the week.
- You can run the Tivoli Storage Manager **query schedule** and **query association** commands to confirm that the schedule and node association are set correctly.

Part II: On the client machine (*NodeA1*)

This example assumes:
- The Tivoli Storage Manager backup-archive client is installed on *NodeA1* in the `/usr/tivoli/tsm/client/ba/bin` directory.
- Data Protection for Oracle is installed on *NodeA1* in the `/usr/tivoli/tsm/client/oracle/bin` directory.
- An AIX operating system is used.

It is recommended that the password expiration for the Data Protection for Oracle node (*NodeA1*) be set to *not* expire. Otherwise the password will become out of sync between Data Protection for Oracle and the scheduler. This can be done with the following command:

```
update node NodeA1 passexp=0
```

Tivoli Storage Manager schedules need to be associated with a node on the Tivoli Storage Manager Server. Since a node must be defined for the Tivoli Storage Manager backup-archive client filesystem backups, Data Protection for Oracle backups, and the Data Protection for Oracle *scheduled* backups, the following configuration requirements must be considered:

Table 19. Scheduler configuration requirements

Application	Login	Option
Data Protection for Oracle	Oracle user	**passwordaccess** *prompt*
Tivoli Storage Manager scheduler	root user	**passwordaccess** *generate*

Scheduling Data Protection for Oracle backups with the Tivoli Storage Manager scheduler requires special configuration issues to be addressed. This procedure addresses this issue by creating a dsm.sys file from which to associate nodes for your client, Data Protection for Oracle, and scheduled backups:

1. Create a dsm.sys file in the `/usr/tivoli/tsm/client/ba/bin` directory (if one does not already exist) and add the following **servername** stanzas:

   a. Add a **servername** stanza for the filesystem backups associated with your Tivoli Storage Manager backup-archive client.

For example:

```
servername   TSMbackup
   commmethod   tcpip
   tcpserveraddress      site.xyzinc.com
   tcpport    1500
   nodename   client
   passwordaccess      generate
```

The **servername** *TSMbackup* setting must be specified in the dsm.opt file
associated with the Tivoli Storage Manager backup-archive client. The
default directory location is /usr/tivoli/tsm/client/ba/bin.

b. Add a **servername** stanza for the backups associated with Data Protection
for Oracle.

For example:

```
servername   TSMOracle
   commmethod   tcpip
   tcpserveraddress      site.xyzinc.com
   tcpport    1500
   passwordaccess      prompt
```

The **servername** *TSMOracle* setting must be specified in the dsm.opt file
associated with Data Protection for Oracle. The default directory location is
/usr/tivoli/tsm/client/oracle/bin. This dsm.opt file can have a unique
name, such as dsmoracle.opt. Make sure the **dsmi_orc_config** option
specifies the user options file (dsmoracle.opt in Step 1b) associated with
Data Protection for Oracle. For example:

```
dsmi_orc_config /usr/tivoli/tsm/client/oracle/bin/dsmoracle.opt
```

c. Add a **servername** stanza for the *scheduled* backups associated with Data
Protection for Oracle.

For example:

```
servername   DPSched
   commmethod   tcpip
   tcpserveraddress      site.xyzinc.com
   tcpport    1500
   nodename   nodea1
   passwordaccess      generate
```

2. Make sure there is a symbolic link to this dsm.sys file so that the file is
   available to the Tivoli Storage Manager API directory
   (/usr/tivoli/tsm/client/api/bin).

3. Create a scheduler backup script (schedbkdb.scr) in the
   /usr/tivoli/tsm/client/oracle/sched/ directory. This scheduler backup script
   will run your RMAN backup command script (bkdb.scr).

   This is an example of the scheduler backup script (schedbkdb.scr):

   Note: You must place the command text, `rman target`
   `agnttest/agnttest@target rcvcat rman/rman@rman` and `cmdfile`
   `/home/oracle/sched/bkdb.scr msglog /home/oracle/sched/bkdb.log`, on
   the same line in the script file. The command text is placed on two lines
   in this example to accommodate page formatting.

```
#!/bin/ksh
export ORACLE_HOME=/orc81/app/oracle/product/806
export PATH=$ORACLE_HOME/bin:$PATH
rman target agnttest/agnttest@target rcvcat rman/rman@rman
cmdfile /home/oracle/sched/bkdb.scr msglog /home/oracle/sched/bkdb.log
```

a. Your scheduler backup script (schedbkdb.scr) must be executable by *root*:

```
$chmod 755 /usr/tivoli/tsm/client/oracle/sched/schedbkdb.scr
```

b. This is an example of an RMAN backup command script (bkdb.scr) that is run by the scheduler backup script (schedbkdb.scr):

```
run {
allocate channel t1 type 'sbt_tape' parms
'ENV=(tdpo_optfile=/home/oracle/sched/tdpo.opt)';
allocate channel t2 type 'sbt_tape' parms
'ENV=(tdpo_optfile=/home/oracle/sched/tdpo.opt)';

backup
format 'df_%t_%s_%p_%u_%c'
(database); }
```

4. Login as the *root* user to the machine where Data Protection for Oracle is installed as node name *NodeA1*. Set the the **tdpo_owner** option in the tdpo.opt file.

5. Start the scheduler. Use the -**servername** parameter to specify the correct stanza to use in the dsm.sys file:

```
dsmc sched -servername=DPSched
```

Data Protection for Oracle is now enabled for scheduled backups.

Appendix C. Messages

ANU0003S   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.

ANU0004E   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.

ANU0005E   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.

ANU0053E   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.

ANU0054E   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.

ANU0055E   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.

ANU0056E   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.

ANU0057E   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.

ANU0058E   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.

ANU0100E   Incomplete command:
Explanation: This message displays the incomplete command that was entered.
System Action: Processing ends.
User Response: Re-enter the complete command.

ANU0101E   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.

ANU0102E   Invalid command:
Explanation: This message displays the invalid command that was entered.
System Action: Processing ends.
User Response: Re-enter a valid command.

ANU0103E   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.

ANU0104E   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.

ANU0105E   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.

ANU0132W   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.

ANU0133W   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.

ANU0134W   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.

ANU0150I   Operation canceled by user.
Explanation: The user has requested that the Data Protection for Oracle application client end by entering ctrl-C.
System Action: Processing ends.
User Response: None

ANU0151E   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.

ANU0152I   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

ANU0153I   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

ANU0154E   The Data Protection for Oracle 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 Oracle 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 Oracle application client.

ANU0155E   The Data Protection for Oracle application client cannot work with the release of Tivoli Storage Manager API you have installed. Please install release *version.release.l evel* **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 Oracle 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 Oracle application client.

ANU0156E   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 Oracle 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.

ANU0160E   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.

ANU0161E   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.

ANU0162E   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.

ANU0163E   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.

ANU0167E   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

ANU0200E   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

ANU0201E   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

ANU0202E   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

ANU0203E   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

ANU0204E   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

ANU0205E   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

ANU0206E   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

ANU0207E   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

ANU0208E   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

ANU0209E   The rename of file (*filename1*) to (*filename2*) failed.
Explanation: An attempt was made to rename a file. This attempt failed.
System Action: Processing ends.
User Response: None

ANU0210E   The Tivoli Storage Manager high level qualifier is too long.
Explanation: An attempt was made to use a Tivoli Storage Manager high level qualifier that was too long. This attempt failed.
System Action: Processing ends.
User Response: None

ANU0211E   The Tivoli Storage Manager low level qualifier is too long.
Explanation: An attempt was made to use a Tivoli Storage Manager low level qualifier that was too long. This attempt failed.
System Action: Processing ends.
User Response: None

ANU0212E   The Tivoli Storage Manager filespace name is too long.
Explanation: An attempt was made to use a Tivoli Storage Manager filespace name that was too long. This attempt failed.
System Action: Processing ends.
User Response: None

ANU0213E   The maximum number of objects allowed per Tivoli Storage Manager transaction is t oo small.
Explanation: In order to maintain backup data integrity, multiple backup objects are sent to the Tivoli Storage Manager server in a single transaction. The Tivoli Storage Manager server has indicated that the maximum number of objects allowed per transaction is less than the minimum required by the Data Protection for Oracle application client.
System Action: Processing ends.
User Response: Increase the maximum number of objects allowed per transaction on the Tivoli Storage Manager server and retry the operation.

ANU0214E   The backup object's management class backup copy group does not exist.
Explanation: The Tivoli Storage Manager server has indicated that the backup object's management class backup copy group does not exist.
System Action: Processing ends.
User Response: Contact your Tivoli Storage Manager server administrator.

ANU0215E   All backup objects do not have the same management class backup copy destination.
Explanation: In order to maintain backup data integrity, multiple backup objects are sent to the Tivoli Storage Manager server within a single transaction. All backup objects within a single transaction are required to have the same management class backup copy destinations.
System Action: Processing ends.
User Response: Contact your Tivoli Storage Manager server administrator.

ANU0216E   Unable to obtain space information for volume (*volumename*).
Explanation: An attempt was made to obtain space information for a volume. This attempt failed.
System Action: Processing ends.
User Response: None

ANU0217E   The Tivoli Storage Manager filespace name is invalid.
Explanation: The filespace name or directory delimeter is invalid.
System Action: Processing ends.
User Response: Check that the filespace name length, characters, and directory delimeters are valid.

ANU0218E   The Tivoli Storage Manager high level qualifier is invalid.
Explanation: The high level qualifier name or directory delimeter is invalid.
System Action: Processing ends.
User Response: Check that the high level qualifier name length, characters, and directory delimeters are valid.

ANU0219E   The Tivoli Storage Manager low level qualifier is invalid.
Explanation: The low level qualifier name or directory delimeter is invalid.
System Action: Processing ends.
User Response: Check that the low level qualifier name length, characters, and directory delimeters are valid.

ANU0256E   The password in your Tivoli Storage Manager options file has expired. Please change your password on the Tivoli Storage Manager server using the 'change password' command and then either change or remove the password value in your options file.
Explanation: Your Tivoli Storage Manager password has expired. You need to change your password.
System Action: Processing ends.
User Response: Obtain a new password for your Tivoli Storage Manager server; node using the change

password command or by asking your Tivoli Storage Manager Administrator to change your password.

ANU0257E   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.

ANU0258E   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.

ANU0259E   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.

ANU0260I   Password successfully changed.
Explanation: The change password command completed successfully
System Action: Processing ends.
User Response: None

ANU0261I   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

ANU0263E   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 b ook. 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.

ANU0264I   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.

ANU0265E   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.

ANU0266E   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.

ANU0267E   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.

ANU0300E   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.

ANU0301E   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.

ANU351E   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.

ANU357E   **Unable to open trace output file**
         file-name.
Explanation: A TRACEFILE option in the user configuration file or on the command line used a directory path and *file-name* combination to which you do not have write access.
System Action: Client program did not initialize.
User Response: Change the TRACEFILE value so that it is a location to which you have write access.

ANU366E   **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.

ANU367E   **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.

ANU368E   **Invalid trace file name (name too long).**
Explanation: A TRACEFILE option in the preferences files used a file name that is too long.
System Action: Client program did not initialize.
User Response: Change the file name used as the TRACEFILE so that it is equal to or less than 255 characters in length.

ANU383E   **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.

ANU384E   **Symbolic link '***linkname***' to '***target***' was**
         successfully deleted.
Explanation: Log '*linkname*' cannot be a symbolic link.
System Action: The symbolic link '*linkname*' is deleted, the log is recreated, and processing stops.
User Response: Check the location of the new file. To specify the location of log files, refer to the user's manual for the 'errorlogname' option, the 'schedlogname' option, and the 'DSM_LOG' environmental variable.

ANU385E   **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*'.

ANU476E   *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.

ANU2500E   **Oracle passed an invalid mode**
Explanation: Invalid mode passed by Oracle.
System Action: The system returns to the calling procedure.
User Response: Contact your system administrator.

ANU2501E   **Oracle passed a null file name**
Explanation: Null file name passed by Oracle.
System Action: The system returns to the calling procedure.
User Response: Contact your system administrator.

ANU2502E   **Wrong data block size**
Explanation: Wrong data block size.
System Action: The system returns to the calling procedure.
User Response: Contact your system administrator.

ANU2503E   **Backup object '***filespacehlll***' already exists**
         on TSM Server.
Explanation: The object has previously been backed up to the TSM Server.
System Action: Data Protection for Oracle returns to the calling procedure.
User Response: If backing up an object, make sure Oracle is generating a unique backup object name.

ANU2504E   **Dissimilar Oracle handle**
Explanation: The handle passed from Oracle is not the same handle that TSM passed back.
System Action: The system returns to the calling procedure.
User Response: Contact your system administrator.

ANU2505I   **End of file reached**
Explanation: End of file reached.
System Action: The system returns to the calling procedure.
User Response: None.

ANU2506E   Wrong Read State
Explanation: The operation must be in READ state.
System Action: The system returns to the calling procedure.
User Response: Contact TSM support.

ANU2507E   Runtime API version is outdated
Explanation: Runtime API is lower than compile time API.
System Action: The system returns to the calling procedure.
User Response: Check compile time API level, obtain same or higher level of API library.

ANU2508E   Wrong write state
Explanation: The operation must be in WRITE state.
System Action: The system returns to the calling procedure.
User Response: Contact TSM support.

ANU2509E   Invalid flag passed
Explanation: Oracle passed an invalid flag.
System Action: The system returns to the calling procedure.
User Response: Contact your system administrator.

ANU2510E   The Caller must be a root user
Explanation: Only a UNIX root user can execute password
System Action: The system returns to the calling procedure.
User Response: Contact your system administrator.

ANU2511E   Reduce the number of copies to that specified in RMAN
Explanation: The duplex copy feature has reached maximum allowed copies.
System Action: The system returns to the calling procedure.
User Response: Reduce the number of backup copies to that allowed by RMAN.

ANU2512E   Could not open license file: *license file*
Explanation: The license file could not be opened.
System Action: The system returns to the calling procedure.
User Response: Check that the license file exists with the correct permissions.

ANU2513E   Could not read license file: *license file*
Explanation: The license file could not be read.
System Action: The system returns to the calling procedure.
User Response: Check that the license file permissions are correct.

ANU2514E   Could not write license file: *license file*
Explanation: The license file could not be written.
System Action: The system returns to the calling procedure.
User Response: Check that the license file permissions are correct.

ANU2515E   Invalid data format in license file: *license file*
Explanation: The license file data format is invalid.
System Action: The system returns to the calling procedure.
User Response: Reinstall the license that came with Data Protection for Oracle.

ANU2516E   Bad checksum of license file: *license file*
Explanation: The license file has a bad checksum.
System Action: The system returns to the calling procedure.
User Response: Reinstall the license that came with Data Protection for Oracle.

ANU2517E   Try and Buy Evaluation period is over for license file: *license file*
Explanation: The Try and Buy Evaluation period is over.
System Action: The system returns to the calling procedure.
User Response: Purchase the product or discontinue use.

ANU2518E   License file: *license file* **not valid for this application**
Explanation: The license file is not intended for this application.
System Action: The system returns to the calling procedure.
User Response: Reinstall the license that came with Data Protection for Oracle.

ANU2519E   Could not read password
Explanation: There is an invalid password or the password file cannot be not found.
System Action: The system returns to the calling procedure.
User Response: Check that password file exists and is valid.

ANU2521E   Error opening *file name*. **Check permissions.**
Explanation: A directory could not be created.
System Action: The system returns to the calling procedure.
User Response: Check that permissions allow the creation of directories.

ANU2522E   No memory available
Explanation: There is not enough system memory to complete the action.
System Action: The system returns to the calling procedure.
User Response: Make more system resources available by closing other applications, then try the action again.

ANU2523E   The Management Class does not match
Explanation: The management class for the query object could not be found.
System Action: The system returns to the calling procedure.
User Response: Contact your system administrator.

ANU2525E   Input date does not match expected date format or range.
Explanation: The input date does not match the expected date format or range.
System Action: The system returns to the calling procedure.
User Response: Check that the format and length of the date entry matches TDP_DATE_FORMAT type and the range of the date values are valid.Valid days are: 1-31Valid months are: 1-12Valid years are:1990-2089

ANU2529E   To Date cannot occur before From Date
Explanation: The specified To Date occurs before From Date.
System Action: The system returns this error.
User Response: Enter a valid To Date that occurs after the From Date.

ANU2530E   Screen size is too small to accurately display the PICK window.
Explanation: You cannot use the PICK option on a workstation that has a screen smaller than 20 characters across and 10 lines down.
System Action: The operation was not completed.
User Response: Retry the operation using a workstation that has a screen with the minimum size.

ANU2531E   Could not create file for Data Protection for Oracle utility
Explanation: The temporary file could not be created.
System Action: The system returns to the calling procedure.
User Response: Check the status of the filespace.

ANU2532E   Unknown Error - View the Data Protection for Oracle error log
Explanation: There was an unknown error. View the tdpoerror.log.
System Action: None
User Response: None

ANU2533E   SQLPLUS error
Explanation: The utility could not find SQLPLUS or there was a scripting error.
System Action: The system returns to the calling procedure.
User Response: Check that SQLPLUS is installed and located in your search path. Verify the password.

ANU2534E   Option file error.
Explanation: The option or option file name is invalid.
System Action: The system returns to the calling procedure.
User Response: Check the tdpoerror.log file for an explanation of the error.

ANU2535I   File */fs/hl/ll = number* **bytes sent**
Explanation: This is the total bytes sent to the server for that file name
System Action: The system returns to the calling procedure.
User Response: Check the TSM Server activity log.

ANU2536I   File */fs/hl/ll = number* **bytes recieved**
Explanation: This is the total bytes received from the server for that backup file name.
System Action: The system returns to the calling procedure.
User Response: Check the TSM Server activity log.

ANU2537E   Error found while parsing options in Data Protection for Oracle options file.
Explanation: There was an error found while parsing the Data Protection for Oracle options file.
System Action: The system returns to the calling procedure.
User Response: Check that the options and the options file are valid.

ANU2538E   Error found while initializing tracing for Data Protection for Oracle.
Explanation: Error found while initializing the Data Protection for Oracle trace facility.
System Action: The system returns to the calling procedure.
User Response: Contact your system administrator.

ANU2539E   *Function Name*: Error - *string* pointer is NULL.
Explanation: A NULL pointer was passed to Data Protection for Oracle.
System Action: The system returns to the calling procedure.
User Response: Contact your system administrator.

ANU2571E   Could not load the library: *library* **Data Protection for Oracle**

Explanation: Library cannot be loaded.

System Action: The system returns to the calling procedure.

User Response: Check that the library exists.

ANU2600E   There is no Registry entry for the TSM API.

Explanation: The Windows Registry entry was not found.

System Action: The system returns to the calling procedure.

User Response: Check that the TSM API is installed correctly.

ANU2601E   There is no Registry entry for the Data Protection for Oracle install path.

Explanation: The Registry Entry for the Data Protection for Oracle install path was not found.

System Action: The system returns to the calling procedure.

User Response: Check that Data Protection for Oracle was installed correctly.

ANU2602E   The object *Filespace NameHigh Level NameLow Level Name* **was not found on the TSM Server**

Explanation: The object name was not found on the TSM Server.

System Action: The system returns to the calling procedure.

User Response: Check that the object name is correct and that it exists on the TSM Server.

ANU2603E   The option *Option Name* **in file** *Filename* **is invalid.**

Explanation: An incorrect option was passed into the Data Protection for Oracle options file.

System Action: The system returns to the calling procedure.

User Response: Verify that your options are correct in the Data Protection for Oracle options file.

ANU2614E   Invalid sequence of function calls to Data Protection for Oracle

Explanation: Data Protection for Oracle received a function call from Oracle that is out of sequence.

System Action: Data Protection for Oracle returns to the calling procedure.

User Response: Contact Oracle or Data Protection for Oracle support.

ANU2615E   Options file 'filename**' not found.**

Explanation: The option file name specified could not be located.

System Action: The system returns to the calling procedure.

User Response: Ensure that an option file exists in the default path or that the user specified option file is valid.

ANU2616E   Empty parameter specified for option 'option**' in options file '**filename**'.**

Explanation: The option specified must have a parameter supplied.

System Action: The system returns to the calling procedure.

User Response: Ensure that a valid parameter for the given option is entered and valid.

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