IBM Tivoli Data Protection for Enterprise Storage Server Databases (DB2 UDB) Installation and User’s Guide
Version 1 Release 2
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IBM Tivoli Data Protection for Enterprise Storage Server Databases is a comprehensive storage management software application. It allows you to perform online backups of DB2 UDB databases to Tivoli Storage Manager server storage. This publication explains how to install, configure, and use IBM Tivoli Data Protection for Enterprise Storage Server Databases.

Who Should Read This Publication

The target audience for this publication are system installers and system users.

In this publication, it is assumed that you have an understanding of the following:
- AIX operating system
- IBM Enterprise Storage Server administration
- DB2 Universal Database (UDB) administration
- Tivoli Storage Manager Backup-Archive Client

Prerequisite and Related Information

The following table indicates which Web site to access for additional information.

<table>
<thead>
<tr>
<th>Product</th>
<th>Web Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tivoli Web site</td>
<td><a href="http://www.tivoli.com/storage">http://www.tivoli.com/storage</a></td>
</tr>
<tr>
<td>IBM Tivoli Data Protection for Enterprise Storage Server Databases</td>
<td><a href="http://www.tivoli.com/products/index/data_protect_ess">http://www.tivoli.com/products/index/data_protect_ess</a></td>
</tr>
<tr>
<td>IBM Tivoli Data Protection for Enterprise Storage Server Databases requirements</td>
<td><a href="http://www.tivoli.com/support/storage_mgr/addbase.htm">http://www.tivoli.com/support/storage_mgr/addbase.htm</a></td>
</tr>
<tr>
<td>Tivoli Storage Manager product requirements and supported devices</td>
<td><a href="http://www.tivoli.com/support/storage_mgr/requirements.html">http://www.tivoli.com/support/storage_mgr/requirements.html</a></td>
</tr>
</tbody>
</table>

The following Tivoli Storage Manager publications provide additional information.

<table>
<thead>
<tr>
<th>Title</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tivoli Storage Manager for AIX Administrator’s Guide</td>
<td>GC35-0403</td>
</tr>
<tr>
<td>Tivoli Storage Manager for AIX Administrator’s Reference</td>
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<td>Tivoli Storage Manager Installing the Clients</td>
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<td>Tivoli Storage Manager Messages</td>
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<td>Tivoli Storage Manager Using the Application Program Interface</td>
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<td>Tivoli Storage Manager for UNIX Using the Backup-Archive Clients</td>
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<td>Tivoli Storage Manager Trace Facility Guide</td>
<td>SH26-4121</td>
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The following IBM publications provide additional information.

### Table 3. Related IBM Publications

<table>
<thead>
<tr>
<th>Title</th>
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<tbody>
<tr>
<td>IBM DB2 UDB Administration Guide: Planning Version 7</td>
<td>SC09-2946</td>
</tr>
<tr>
<td>IBM DB2 UDB Administration Guide: Implementation Version 7</td>
<td>SC09-2944</td>
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<tr>
<td>IBM Enterprise Storage Server Host Systems Attachment Guide 2105 Models E10, E20, F10, and F20</td>
<td>SC26-7296</td>
</tr>
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</table>

### Conventions Used in This Document

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

<table>
<thead>
<tr>
<th>Example</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>bold</strong></td>
<td>Commands, keywords, authorization roles, or other information that you must use appear in <strong>bold</strong>. Example: Log on to the Production System as <strong>root</strong> user.</td>
</tr>
<tr>
<td><em>italics</em></td>
<td>Values or variables that you must provide appear in <em>italics</em>. Emphasized words and phrases also appear in <em>italics</em>. Example: The node name of the production node and backup node must not be the same.</td>
</tr>
<tr>
<td><strong>bold</strong> <em>italics</em></td>
<td>Options and parameters appear in <strong>bold</strong> <em>italics</em>. Example: Specify the password of the username defined in the <strong>target_database_username</strong> parameter.</td>
</tr>
<tr>
<td>monospace</td>
<td>File names, directories, parameters, URLs, and output examples appear in monospace. Example: TDP for ESS uses the <strong>dsm.opt</strong> and <strong>dsm.sys</strong> files located in the Backup-Archive Client directory (/usr/tivoli/tms/client/ba/bin by default).</td>
</tr>
<tr>
<td>UPPER CASE</td>
<td>Environment variables associated with Tivoli Storage Manager or DB2 UDB appear in UPPPER CASE. Example: Make sure the DSM_DIR environment variable is set correctly.</td>
</tr>
</tbody>
</table>
Contacting Customer Support

If you have a problem with any Tivoli product, you can contact Tivoli Customer Support. See the *Tivoli Customer Support Handbook* at the following Web site:

http://www.tivoli.com/support/handbook

The handbook provides information about how to contact Tivoli Customer Support, depending on the severity of your problem, and the following information:

- Registration and eligibility
- Telephone numbers and e-mail addresses, depending on the country you are in
- What information you should gather before contacting support

Accessing Publications Online

You can access many Tivoli publications online at the Tivoli Customer Support Web site:

http://www.tivoli.com/support/documents

These publications are available in PDF or HTML format, or both. Translated documents are also available for some products.

Ordering Publications

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

http://www.ibm.com/shop/publications/order

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

- In the United States: 800-879-2755
- In Canada: 800-426-4968
- In other countries, for a list of telephone numbers, see the following Web site:
  http://www.tivoli.com/inside/store/lit_order.html

Providing Feedback about Publications

We are very interested in hearing about your experience with Tivoli products and documentation, and we welcome your suggestions for improvements. If you have comments or suggestions about our products and documentation, contact us in one of the following ways:

- Send an e-mail to pubs@tivoli.com
- Complete our customer feedback survey at the following Web site:
  http://www.tivoli.com/support/survey
Introducing TDP for ESS

IBM Tivoli Data Protection for Enterprise Storage Server Databases (TDP for ESS) minimizes the impact on DB2 Universal Database servers (DB2 UDB) while performing Tivoli Storage Manager database backups. TDP for ESS off-loads the transfer of backup data from the production database server to a backup database server. The DB2 UDB database must reside on an IBM Enterprise Storage Server. TDP for ESS features high-efficiency backup and recovery of business-critical applications. This feature minimizes backup-related downtime and user disruption on the production host.

The TDP for ESS operating environment is shown in Figure 1.
TDP for ESS Operating Environment

The operating environment consists of a DB2 UDB database executing on an AIX server attached to an IBM Enterprise Storage Server. This AIX server is the Production System. Another AIX server, the Backup System, attaches to the Enterprise Storage Server to back up the copied database to a Tivoli Storage Manager server. In addition, TDP for ESS uses the Tivoli Storage Manager Backup-Archive Client and Application Program Interface (API).

See “Software” on page 3 for a detailed list of applications that are required by TDP for ESS.

TDP for ESS Functions

TDP for ESS allows you to:

- Back up DB2 UDB databases with minimal impact and downtime on the production DB2 UDB database server
- Automate backup operations
- Integrate with Tivoli Storage Manager Media Management functions
- Support IBM Subsystem Device Driver functions

DB2 UDB Database Backup

TDP for ESS uses the IBM Enterprise Storage Server flashcopy feature to create a point-in-copy of database volumes from the DB2 UDB Production System. The copied database volumes are then made available for back up by a secondary host (Backup System). Because the Backup System performs most of the processing, the Production System can dedicate processor time to other applications. This greatly reduces any backup-related performance impact on the Production System.

Scheduled Backups

You can schedule automated DB2 UDB backups from the Tivoli Storage Manager server. You can select when the backups occur without waiting for off-peak hours or maintenance downtime.

Integration with Tivoli Storage Manager

All storage devices and media management capabilities of Tivoli Storage Manager are available to TDP for ESS. You can share the devices used for other backups or give DB2 UDB exclusive use of certain devices and media. TDP for ESS supports media and tape management for off-site vaulting.

IBM Subsystem Device Driver Support

TDP for ESS provides basic support for IBM Subsystem Device Driver (SDD). SDD resides on the host servers (Production System and Backup System) with the native device driver for the Enterprise Storage Server. SDD uses redundant connections between the host server and disk storage in an Enterprise Storage Server to provide enhanced performance and data availability. Refer to your SDD documentation for further information.
Installing TDP for ESS

Attention
For current information concerning installation of TDP for ESS, refer to the README.TDPESS.DB2 file shipped on the product installation media.

This chapter provides information on environment requirements and installation instructions for TDP for ESS. This information is presented in two sections:

Pre-Installation Requirements
This section describes the hardware, software, and environment required before installing TDP for ESS. An overview of the TDP for ESS operating environment is shown in Figure 1 on page 1.

Installing TDP for ESS
This section describes how to install TDP for ESS.

TDP for ESS must be configured after successful installation. See Chapter 3 "Configuring TDP for ESS" on page 7 for detailed instructions.

Pre-Installation Requirements

Hardware
The following hardware must exist before installing TDP for ESS:

- Two RS/6000 workstations (one for the Production System and one for the Backup System)
- IBM Enterprise Storage Server
- Disk space: 1 MB
- Memory: 64 MB

Software
The following software must be installed and configured on both the Backup System and Production System before installing TDP for ESS:

- Tivoli Storage Manager Backup-Archive Client Version 4.2.0 (or later)
- DB2 UDB for AIX Version 7.1 with FixPack 4 (or later)
- AIX 4.3.3
- Copy Services CLI code corresponding to Enterprise Storage Server microcode level sint0821 (MegaCD level: 1.3.3.21)

The following software must be accessible to both the Backup System and Production System before installing TDP for ESS:

- Tivoli Storage Manager Server Version 4.2.0 (or later)
Environment

The following environment must exist before installing TDP for ESS:

Enterprise Storage Server

- Both RS/6000 workstations must be connected to the Enterprise Storage Server.
- The Enterprise Storage Server must be configured so that proper logical unit numbers (LUNs) are available to the Production System and the Backup System.
- Enterprise Storage Server Copy Services CLI code must be installed on the Production System and the Backup System. The path to the Copy Services code is specified with the `shark_copy_service_code` parameter in the Setup File. See [Setup File Parameters](#) on page 9 for information about this parameter.
- Enterprise Storage Server LUNs containing the DB2 UDB database (Source Volumes) must be accessible to the Production System.
- Enterprise Storage Server LUNs intended to be used as the Target Volumes for backing up the DB2 UDB database must be accessible to the Backup System.
- The Source Volumes and Target Volumes must reside in the same logical subsystem (LSS).
- The Target Volumes and Source Volumes must be the same size.

DB2 UDB

- DB2 UDB is installed on both the Production System and Backup System.
- Create the DB2 UDB target database on the Production System so that the datafiles reside on the Enterprise Storage Server Source Volumes, as defined above.
- DB2 UDB databases, system directory, volume directory, and logs must reside on Database Managed Storage (DMS) tablespaces only. DMS tablespaces must be allocated on a journaled file system or on AIX raw devices only.

SDD

TDP for ESS supports the following SDD configurations:

- SDD is not installed on the Production System and the volume group that contains the DB2 UDB database has AIX hdisk devices.
- SDD is installed on the Production System and the volume group that contains the DB2 UDB database has AIX vpath devices.
- SDD is installed on the Production System and the volume group that contains the DB2 UDB database has AIX hdisk devices.
- SDD is installed on the Production System but not on the Backup System.
- SDD is installed on the Backup System but not on the Production System.

Note that TDP for ESS does not support SDD volume groups that contain a DB2 UDB database which has a combination of hdisk and vpath devices.
Installation Procedure

Important! TDP for ESS must be installed on both the Backup System and Production System.

Perform these instructions to install TDP for ESS:
1. Insert the CD-ROM containing the client package into the CD-ROM drive.
2. Log on to the Production System as 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. Highlight the TDP for ESS installable package (tivoli.tsm.client.essdb2.aix43.32bit) and press F7.
9. Highlight the TDP for ESS publications installable package (tivoli.tsm.client.essdb2.books) and press F7.
10. Press Enter.
11. When the Install and Update from LATEST Available Software window displays, press Enter.
12. A window displays with this message:

ARE YOU SURE?

Press Enter to continue the installation procedure.
13. After successfully installing TDP for ESS, press F10 to exit the smitty install environment.

Repeat this installation procedure on the Backup System.

TDP for ESS Files

The following TDP for ESS files are installed in the /usr/tivoli/tsm/client/tdpess/db2 directory:
- Sample Server Script (serverscript.smp.db2)
- Sample Setup File (setupfile.smp.db2)
- Readme First File (README.TDPESS.DB2)

The following TDP for ESS files are installed in the /usr/tivoli/tsm/client/tdpess/db2/bin directory:
- Production Executable (essdb2p)
- Backup Executable (essdb2b)
- License File (agent.lic)
TDP for ESS Documentation

The IBM Tivoli Data Protection for Enterprise Storage Server Databases Installation and User’s Guide Version 1 Release 2 is installed in HTML and PDF formats in the following directories:

- HTML format (/usr/tivoli/tsm/client/books/htm)
  - ansttfrm.htm is the top file
- PDF format (/usr/tivoli/tsm/client/books/pdf)
This chapter provides the following instructions on how to configure TDP for ESS so you can back up and restore your databases:

1. Register your workstations with the Tivoli Storage Manager server.
2. Specify a Tivoli Storage Manager management class for your backups.
3. Create a Setup File with information about the database you want to back up.
4. Configure your TDP for ESS and DB2 UDB environment. This includes:
   - setting IDs, instances, and passwords
   - configuring your client software by specifying options in the client user options file (dsm.opt) and the client system options file (dsm.sys)
   - setting your client environment variables:
     - DSM_DIR
     - DSM_CONFIG
     - DSM_LOG
     - DSMI_DIR
     - DSMI_CONFIG
     - DSMI_LOG

Step 1 and Step 4 must be performed on both the Production System and Backup System.

1. Register Your Workstations with the Tivoli Storage Manager Server

TDP for ESS requires both the Backup System and Production System to be registered as Tivoli Storage Manager clients. A node name and a password (if one is required) is required to identify each client. Tivoli Storage Manager maintains a password for each node name. If a Tivoli Storage Manager client already exists on the system, it is recommended that a separate and unique node name for TDP for ESS be used on the same system.

See Tivoli Storage Manager for AIX Administrator’s Guide and Tivoli Storage Manager for AIX Administrator’s Reference for more information about registering workstations to the Tivoli Storage Manager server.
2. Specify a Tivoli Storage Manager Management Class

When you back up a database, the default management class for your node is used. Rather than binding a different management class for DB2 UDB backups, we recommended that you specify a different domain. Create a new domain to be used for the DB2 UDB backups and register your node to this new domain. The DB2 UDB backups will be bound to the Default Management Class within this new domain. When defining the backup copy group within this Default Management Class, set the following parameter values so that deleted backups are immediately removed from server storage:

- VERDELETED=0
- RETONLY=0

Increase the value of the `committimeout` option on the Tivoli Storage Manager server to 600 seconds to prevent a time-out from occurring during large database backups.

You can override the default value by specifying a different value with the client `include` option. The `include` option can be placed directly in the `dsm.sys` file located in the directory pointed to by `$DSMI_DIR` or in the include-exclude options file. The name of the include-exclude options file is placed in the client system options file (`dsm.sys`) located in the directory pointed to by `$DSMI_DIR`.

For example, to assign a management class name `db2backup` to all of the DB2 UDB backups with a default file space name of `tsmdb2`, the include statement is:

```shell
include /tsmdb2/.../* db2backup
```

All the files backed up with a default file space name of `tsmdb2` are assigned to management class `db2backup`.

See *Tivoli Storage Manager Installing the Clients* for more information.

3. Create Your Setup File

A sample Setup File (`setupfile.smp.db2`) is provided in the TDP for ESS default installation directory (`/usr/tivoli/tsm/client/tdpess/db2`).

You must create a Setup File that contains your database information before attempting to perform a backup or restore procedure. The Setup File has the following characteristics:

- the Setup File is used only on the Production System and can be placed in any directory location with any given name.
- a different Setup File is recommended for each database that is backed up.
Setup File Parameters

Setup File parameters have the following characteristics:

- all parameters are terminated by a colon (:) for example:
  java_home_directory:
- at least one space must exist between the colon (:) and the parameter value, for example:
  shark_password: t6y7uew
- comment out optional parameters by placing a pound sign (#) in front of the parameter

<table>
<thead>
<tr>
<th>Table 5. Required Setup File Parameters</th>
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</thead>
<tbody>
<tr>
<td>Parameter</td>
</tr>
<tr>
<td>java_home_directory</td>
</tr>
<tr>
<td>primary_copyservices_servername</td>
</tr>
<tr>
<td>shark_copy_service_code</td>
</tr>
<tr>
<td>shark_password</td>
</tr>
<tr>
<td>shark_target_volume</td>
</tr>
<tr>
<td>shark_username</td>
</tr>
<tr>
<td>target_database_instance</td>
</tr>
<tr>
<td>target_database_name</td>
</tr>
<tr>
<td>target_database_password</td>
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<table>
<thead>
<tr>
<th>Table 6. Optional Setup File Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter</td>
</tr>
<tr>
<td>backup_copyservices_servername</td>
</tr>
<tr>
<td>clear_target_pvid</td>
</tr>
<tr>
<td>database_backup_buffer_size</td>
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<tr>
<td>database_backup_num_buffers</td>
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<td>database_backup_parallelism</td>
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<td>flashcopy_type</td>
</tr>
<tr>
<td>instance_home</td>
</tr>
<tr>
<td>tsm_backup_num_sessions</td>
</tr>
</tbody>
</table>
Setup File Parameters

Required Parameters

java_home_directory: java installation directory
Specify the fully qualified path to the java installation directory on the Production System. Note that the path must be the same on the Backup System.

Example:
java_home_directory: /usr/jdk_base

primary_copyservices_servername: primary Copy Services servername
Specify the name of the primary Copy Services server located within an Enterprise Storage Server cluster. You can specify either the numeric IP address or the DNS name of the server.

Example 1:
primary_copyservices_servername: primserver112.mydomain.com

Example 2:
primary_copyservices_servername: 7.241.65.67

shark_copy_service_code: path to Copy Services code
Specify the fully qualified path to the Copy Services CLI code installed on the Production System. Note that the path must be the same on the Backup System.

Example:
shark_copy_service_code: /home/ibm2105cli

shark_password: password of the username specified by shark_username
Specify the password required for the username entered in the shark_username parameter.

Example:
shark_password: admin112pw

shark_target_volume: LUN number of the ESS target volume
Specify the serial number of the Enterprise Storage Server LUNs to which the DB2 UDB database is to be copied. The specified LUNs (Target Volumes) require the following:

- they must be in the same LSS as the Source Volumes which contain the production DB2 UDB database
- they must be the same size as the Source Volumes which contain the production DB2 UDB database

Example 1: You must enter the corresponding source and size values for the Target Volumes as shown in the following example:
shark_target_volume: 401FCA90 40EFC9A0 Size=2.0 GB

Example 2: If the corresponding source and size values for the Target Volumes are not entered, a dash (-) character must be entered in both fields as shown in the following example:
shark_target_volume: 401FCA90 --
**shark_username:** *ESS username with Copy Services access*
Specify the username required to log on to the Enterprise Storage Server. This username must have access to perform Enterprise Storage Server Copy Services tasks.

Example:
```
shark_username: root
```

**target_database_instance:** *instance name*
Specify the name of the DB2 UDB database instance.

Example:
```
target_database_instance: mydb2usr
```

**target_database_name:** *database name*
Specify the name of the DB2 UDB database to be backed up.

Example:
```
target_database_name: mydb
```

**target_database_password:** *username password*
Specify the password of the username defined in the `target_database_instance` parameter.

Example:
```
target_database_password: jebpw1
```

**Optional Parameters**

**backup_copysservices_servername:** *backup Copy Services servername*
Specify the name of the backup Copy Services server located within an Enterprise Storage Server cluster. You can specify either the numeric IP address or the DNS name of the server. The default value is `none`.

Example 1:
```
backup_copysservices_servername: corpbuserver.mydomain.com
```

Example 2:
```
backup_copysservices_servername: 8.223.56.91
```

**clear_target_pvid:** *yes|no* *(default: yes)*
Specify whether or not you want to clear the physical volume ID (PVID), assigned by AIX, to the Target Volumes after completing a backup.

A `yes` value clears the PVID and removes the disk. This allows the same set of target LUNs or a different set of target LUNs to be used for future backups. This is the default value.

A `no` value removes the disk but does not clear the PVID. This saves the metadata of the Target Volumes, allowing you to access the data from them at a later date. The database needs to be backed up with the `flashcopy_type` parameter set to `copy` to enable future access to the data. If you want to recover a DB2 UDB database from the Backup System, see “Recovering a DB2 UDB Database from the Backup System” on page 31 for detailed instructions.

Example:
```
clear_target_pvid: yes
```
**database_backup_buffer_size:** 8 - 1024 (default: 16)
Specify the size, in pages, of buffers used to build the backup image. The size of the buffers can be from 8 to 1024 pages. The default buffer size is 16 pages.

Example:
```
database_backup_buffer_size: 16
```

**database_backup_num_buffers:** 1 - 8 (default: 2)
Specify the number of buffers used to transfer data between the server and the API. You can specify from 1 to 8 buffers. The default number of buffers is 2.

Example:
```
database_backup_num_buffers: 2
```

**database_backup_parallelism:** 1 - 8 (default: 1)
Specify the number of table spaces which can be read in parallel by the DB2 UDB backup utility. You can specify from 1 to 8 table spaces. Increasing the value of this parameter reduces the amount of time required to perform a backup. The default value is 1.

Example:
```
database_backup_parallelism: 1
```

**flashcopy_type:** nocopy|copy (default: nocopy)
Specify the type of flashcopy the Enterprise Storage Server performs.

A *copy* value directs the Enterprise Storage Server to perform a bit-by-bit copy of data from one physical volume to another physical volume. This value is recommended under the following conditions:
- the database to be backed up contains few physical disks (for example, less than 10 physical disks)
- a copy of the DB2 UDB data is desired on the Target Volume
- the `clear_target_pvid` parameter is set to `no`

Note that a successful backup of the DB2 UDB database is obtained even when the `flashcopy_type` parameter is set to `nocopy` and `clear_target_pvid` is set to `no`. The Tivoli Storage Manager server will contain a valid backup of the DB2 UDB database. However, the Target Volumes will contain invalid data and cannot be used as a "disk backup."

A *nocopy* value directs the Enterprise Storage Server NOT to perform a bit-by-bit copy of data from one physical volume to another physical volume. This value is recommended under the following conditions:
- the database to be backed up contains several physical disks (for example, more than 10 physical disks)
- a copy of the DB2 UDB data is not desired on the Target Volume
- `clear_target_pvid` is set to `yes`

This is the default value.

Example:
```
flashcopy_type: nocopy
```
instance_home: instance home directory

Specify the home directory of the DB2 UDB database instance which contains the db2profile. TDP for ESS uses this parameter to activate the db2profile. If this value is not specified, TDP for ESS uses the db2profile located in the /home/target_database_instance/sql1ib directory.

Example:
instance_home: /home/tominst1

tsm_backup_num_sessions: 1 - 5 (default: 1)

Specify the number of Tivoli Storage Manager backup sessions to use. You can specify from 1 to 5 multiple sessions. The default value is to use 1 session.

Example:
tsmt_backup_num_sessions: 3

Example Setup File

Optional parameters are preceded by a pound sign (#).

#============================================================#
# This file contains setup information for IBM TDP for ESS Databases#
#============================================================#

#### Parameters for DB2 UDB database to be backed up ####

target_database_name: mydb
target_database_instance: tominst1
instance_home: /home/tominst1
target_database_password: tompw
database_backup_num_buffers: 2
database_backup_buffer_size: 16
database_backup_parallelism: 1
tsm_backup_num_sessions: 3

#### Parameters for the IBM Enterprise Storage Server#####

flashcopy_type: nocopy
java_home_directory: /usr/jdk_base
shark_copy_service_code: /home/ibm2105cli
shark_username: root
shark_password: aw3esz4
primary_copyservices_servername: primserver.xyzdomain.com
backup_copyservices_servername: none
shark_target_volume: 50FFCA90 515FCA90 Size=1.0 GB

#### Parameters for AIX/Logical Volume Manager#########

clear_target_pvid: yes
4. Configure TDP for ESS and DB2 UDB

1. Create a UNIX user account on both the Production System and Backup System. These two UNIX user accounts must have the same user name and password on both the Production System and Backup System. You will assign this UNIX user account authority over DB2 instances created in Step 2.

2. Log on to the Production System as root user and perform the following:
   a. Create a DB2 instance with the same name as the UNIX user account created in Step 1. This assigns the UNIX user account created in Step 1 authority over this DB2 instance.
      - Assuming the UNIX user account created in Step 1 is mydb2usr, issue the command:
        ```
        db2icrt -u mydb2usr mydb2usr
        ```
      - and mydb2usr is the name of the new DB2 instance.
   b. Run the db2iupdt command on the Production System to update the DB2 instance:
      ```
      db2iupdt mydb2usr
      ```

3. Log on to the Backup System as root user and perform the following:
   a. Create a DB2 instance with the same name as the UNIX user account created in Step 1. This assigns the UNIX user account created in Step 1 authority over this DB2 instance.
      - Assuming the UNIX user account created in Step 1 is mydb2usr, issue the command:
        ```
        db2icrt -u mydb2usr mydb2usr
        ```
      - and mydb2usr is the name of the new DB2 instance.
   b. Run the db2iupdt command on the Backup System to update the DB2 instance:
      ```
      db2iupdt mydb2usr
      ```

4. Log on to the Production System as the DB2 instance owner and create the target database. Make sure the file systems and raw devices to be used by the database reside on Enterprise Storage Server disks.
   a. Assuming the file system on which the database is to be mounted is /mydb2fs, and the name of the target database is mydb, issue the AIX chown command with the following arguments:
      ```
      chown mydb2usr:<group to which mydb2usr belongs> /mydb2fs
      ```
   b. Issue the db2start command:
      ```
      db2start
      ```
   c. Issue the following command:
      ```
      db2 create database mydb on /mydb2fs
      ```

5. Log on to the Production System as root user. Configure your client software by performing the following:

---

1. You can add additional tablespaces to the target database created in this step. New tablespaces must be located on Enterprise Storage Server devices, not local disks.
a. Specify options in the TDP for ESS options files (dsm.opt and dsm.sys). See Table 7 on page 17.

b. Specify options in the DB2 UDB options files (dsm.opt and dsm.sys). See Table 8 on page 18.

c. Set your environment variables for TDP for ESS. See Table 9 on page 20.

d. Set your environment variables for DB2 UDB. See Table 10 on page 20.

6. Log on to the Backup System as root user. Configure your client software by performing the following:

   a. Specify options in the TDP for ESS options files (dsm.opt and dsm.sys). See Table 7 on page 17.

   b. Specify options in the DB2 UDB options files (dsm.opt and dsm.sys). See Table 8 on page 18.

   c. Set your environment variables for TDP for ESS. See Table 9 on page 20.

   d. Set your environment variables for DB2 UDB. See Table 10 on page 20.

7. Log on to the Production System as the DB2 instance owner and perform the following:  

   a. Update the tsm_nodename and tsm_password configuration parameters on the target database to specify the node and password to which DB2 UDB databases will be backed up.

      Assuming the target database is mydb (as shown in Step 4), and the node to which DB2 UDB databases will be backed up is mydb2node, issue the command:

```sql
db2 update db config for mydb using TSM_NODENAME mydb2node
  TSM_PASSWORD<mydb2node password>
```

   b. Activate the logretain flag to make the target database recoverable.

      Note: Perform this step only when the target database is being backed up with TDP for ESS for the first time.

      Assuming the target database is mydb (as shown in Step 4), log on to the Production System as the DB2 instance owner (created in Step 1) and issue the command:

```sql
db2 update db config for mydb using LOGRETAIN on
```

   c. Manually back up the target database offline to turn off the backup_pending flag.

      Note: Perform this step only when the target database is being backed up with TDP for ESS for the first time.

      Assuming the target database is mydb (as shown in Step 4), log on to the Production System as the DB2 instance owner (created in Step 1) and issue the command:

```sql
db2 backup db mydb to /dev/null
```

   d. Verify these changes take affect by performing the following steps on the Production System:

2. Step 7 assumes the node to which DB2 UDB databases will be backed up is already registered on the server.

3. Do not use the db2start and db2stop commands unless you are sure the DB2 instance on the Production System can be stopped safely.
1) Issue the command:
   db2 force applications all

2) Issue the command:
   db2 terminate

3) Issue the command:
   db2 get db config for <database name>


9. Log on to the Production System as root user and perform the following:
   a. Run one of the following commands based on the shell environment where your database instance is located:
      - C shell: db2cshrc
      - Korn shell: db2profile
   b. Issue the command:
      essdb2p <Setup File name> <backup node name> <temp file name>

      where the <backup node name> is the same node name specified on the Backup System in the dsm.sys file in the directory pointed to by DSM_DIR, under the stanza specified in the dsm.opt file as pointed to by DSM_CONFIG.

10. After the production executable (essdb2p) completes successfully, log on to the Backup System as root user and perform the following:
    a. Run one of the following commands based on the shell environment where your database instance is located:
       - C shell: db2cshrc
       - Korn shell: db2profile
    b. Issue the command:
       essdb2b <production node name> <temp filename>

       where the <production node name> is the same node name specified on the Production System in the dsm.sys file in the directory pointed to by DSM_DIR, under the stanza specified in the dsm.opt file as pointed to by DSM_CONFIG.

---

4. After the backup executable (essdb2b) is run on a Backup System that has SDD installed, TDP for ESS removes the hdisk and vpath devices that correspond to the Target Volumes. In order to bring up the hdisk and vpath devices again, see "Restoring hdisks for SDD" on page 31.
Configuring Your Client Software

You must specify options for your Tivoli Storage Manager API and Backup-Archive Client software before performing a backup of your databases with TDP for ESS. Specify these options in the client user options files (dsm.opt) and the client system options files (dsm.sys). Since options must be specified on both the Production System and Backup System, two sets of user options files and two sets of system options files are required.

TDP for ESS Options Files

TDP for ESS uses the dsm.opt and dsm.sys files located in the Backup-Archive Client installation directory (/usr/tivoli/tsm/client/ba/bin) or as pointed to by DSM_DIR and DSM_CONFIG.

Specify the following options and values in the TDP for ESS options files on both the Production System and Backup System:

Table 7. Required TDP for ESS options and values

<table>
<thead>
<tr>
<th>Filename</th>
<th>Required Option</th>
<th>Required Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>dsm.opt</td>
<td>servername</td>
<td>server name defined in stanza in dsm.sys file pointed to by DSM_DIR</td>
</tr>
<tr>
<td>dsm.sys</td>
<td>nodename</td>
<td>the node name in dsm.sys on the Production System must be different from the node name in dsm.sys on the Backup System</td>
</tr>
<tr>
<td></td>
<td>schedmode</td>
<td>prompt</td>
</tr>
<tr>
<td></td>
<td>passwordaccess</td>
<td>generate</td>
</tr>
<tr>
<td></td>
<td>tcpserveraddress</td>
<td>same TCP/IP server address as defined in stanza in dsm.sys file pointed to by DSM_DIR</td>
</tr>
<tr>
<td></td>
<td>tcpport</td>
<td>TCP/IP port address for server defined by tcpserveraddress</td>
</tr>
</tbody>
</table>

TDP for ESS Options File Considerations

- The node name specified in the stanza defined in the dsm.sys file pointed to by DSM_DIR on the Production System is the production node.
- The node name specified in the stanza defined in the dsm.sys file pointed to by DSM_DIR on the Backup System is the backup node.
- The node name of the production node and backup node must be different.
- The production node and backup node must reside on the same server.
TDP for ESS Options File Examples

The dsm.opt file in the /usr/tivoli/tsm/client/ba/bin directory on the Production System and Backup System:

```
servername server1
```

The stanza for `server1` in the dsm.sys file in the /usr/tivoli/tsm/client/ba/bin directory on the Production System:

```
servername server1
tcps server1.test.rsch.com
tcpp 1500
passworda generate
schedmode prompt
nodename prodnode
```

The stanza for `server1` in the dsm.sys file in the /usr/tivoli/tsm/client/ba/bin directory on the Backup System:

```
servername server1
tcps server1.test.rsch.com1
tcpp 1500
passworda generate	schedmode prompt
nodename bunode
```

DB2 UDB Options Files

DB2 UDB uses the dsm.opt and dsm.sys files located in the Tivoli Storage Manager API installation directory (/usr/tivoli/tsm/client/api/bin) or pointed to by DSMI_DIR and DSMI_CONFIG.

Specify the following options and values in the DB2 UDB options files on both the Production System and Backup System:

Table 8. Required DB2 UDB option values

<table>
<thead>
<tr>
<th>Filename</th>
<th>Required Option</th>
<th>Required Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>dsm.opt</td>
<td><code>servername</code></td>
<td>server name defined in stanza in dsm.sys file pointed to by DSMI_DIR</td>
</tr>
<tr>
<td></td>
<td><code>nodename</code></td>
<td>the node name in dsm.sys on the Production System must be the same as the node name in dsm.sys on the Backup System</td>
</tr>
<tr>
<td></td>
<td><code>passwordaccess</code></td>
<td>prompt</td>
</tr>
<tr>
<td></td>
<td><code>tcpserveraddress</code></td>
<td>same TCP/IP server address as defined in the stanza in dsm.sys file pointed to by DSMI_DIR</td>
</tr>
<tr>
<td></td>
<td><code>tcpport</code></td>
<td>TCP/IP port address for server defined by tcpserveraddress</td>
</tr>
</tbody>
</table>
DB2 UDB Options File Examples

The `dsm.opt` file in the `/usr/tivoli/tsm/client/api/bin` directory on the Production System and Backup System:

```
servername server2
```

The stanza for `server2` in the `dsm.sys` file in the `/usr/tivoli/tsm/client/api/bin` directory on the Production System:

```
servername server2
tcps server1.test.rsch.com
tcpp 1500
passworda prompt
nodename db2udb1
```

The stanza for `server2` in the `dsm.sys` file in the `/usr/tivoli/tsm/client/api/bin` directory on the Backup System:

```
servername server2
tcps server1.test.rsch.com
tcpp 1500
passworda prompt
nodename db2udb1
```

Options File Requirements

The system options files (`dsm.sys`) must refer to the same server.

- See "Configuring System Options Files to the Same Server" on page 29 for instructions and examples.

The system options files (`dsm.sys`) can be configured with multiple server stanzas or as two separate files.

- To configure the system options files (`dsm.sys`) as multiple server stanzas:
  1. See "Configuring Multiple Server Stanzas" on page 30 for instructions and examples.
  2. Set the option values in the `dsm.opt` and `dsm.sys` files as shown in Table 7 on page 17 and Table 8 on page 18.
  3. Make sure the `dsm.opt` file points to a server stanza defined in the `dsm.sys` file.

- To configure the system options files (`dsm.sys`) as two separate files:
  1. Set the option values in the `dsm.opt` and `dsm.sys` files as shown in Table 7 on page 17 and Table 8 on page 18.
  2. Make sure the `dsm.opt` file points to a server defined in the `dsm.sys` file.
Setting Your Environment Variables

Set your environment variables on both the Production System and Backup System.

**TDP for ESS** shares environment variables with the Backup-Archive Client:

<table>
<thead>
<tr>
<th>Environment Variable</th>
<th>Value</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSM_DIR</td>
<td>The fully-qualified path containing dsm.sys</td>
<td>/usr/tivoli/tsm/client/ba/bin</td>
</tr>
<tr>
<td>DSM_CONFIG</td>
<td>The fully-qualified path including the dsm.opt file</td>
<td>/usr/tivoli/tsm/client/ba/bin/dsm.opt</td>
</tr>
<tr>
<td>DSM_LOG</td>
<td>The fully-qualified path containing dsmerror.log and tdpess.log.</td>
<td>Current working directory.</td>
</tr>
</tbody>
</table>

**DB2 UDB** shares environment variables with the API:

<table>
<thead>
<tr>
<th>Environment Variable</th>
<th>Value</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>DSMI_DIR</td>
<td>The fully-qualified path containing dsm.sys</td>
<td>/usr/tivoli/tsm/client/api/bin</td>
</tr>
<tr>
<td>DSMI_CONFIG</td>
<td>The fully-qualified path including the dsm.opt file</td>
<td>/usr/tivoli/tsm/client/api/bin/dsm.opt</td>
</tr>
<tr>
<td>DSMI_LOG</td>
<td>The fully-qualified path containing dserror.log. Directory must have writeable rights.</td>
<td>/usr/tivoli/tsm/client/api/bin</td>
</tr>
</tbody>
</table>

Additional information about environment variables is located in *Tivoli Storage Manager for UNIX Using the Backup-Archive Clients*, *Tivoli Storage Manager Installing the Clients*, and *Tivoli Storage Manager Using the Application Program Interface*. 
How to Back Up Your Database

TDP for ESS backs up a self-generated temporary file on the Production System to the Tivoli Storage Manager server. This temporary file contains information required by the application on the Backup System to successfully back up the DB2 UDB database. A “set access” is performed for the Backup System to be able to restore this temporary file from the Tivoli Storage Manager server. TDP for ESS does not remove this access after the backup executable (essdb2b) has restored this file.

Manual Backup

Manual Backup
A Manual Backup performs a one-time backup of a DB2 UDB database.

Table 11. Files used during a Manual Backup

<table>
<thead>
<tr>
<th>Filename</th>
<th>Description</th>
<th>Default Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>essdb2p</td>
<td>TDP for ESS Production</td>
<td>/usr/tivoli/tsm/client/tdpess/db2/bin</td>
</tr>
<tr>
<td></td>
<td>Executable</td>
<td></td>
</tr>
<tr>
<td>essdb2b</td>
<td>TDP for ESS Backup Executable</td>
<td>/usr/tivoli/tsm/client/tdpess/db2/bin</td>
</tr>
<tr>
<td>setupfile.smp.db2</td>
<td>Sample Setup File</td>
<td>/usr/tivoli/tsm/client/tdpess/db2</td>
</tr>
</tbody>
</table>

1. Log on to the Production System as root user.
2. Copy the sample Setup File to db2setup:
   cp setupfile.smp.db2 db2setup
3. Edit db2setup with the appropriate Setup File parameter values:
   vi db2setup
   See "Setup File Parameters" on page 9 for available values.
4. Run one of the following commands based on the shell environment where your database instance is located:
   - C shell: db2cshrc
   - Korn shell: db2profile
5. Run the production executable (essdb2p) with the necessary arguments:
   essdb2p <setup filename> <backup host node name> <temp filename>
6. Log on to the Backup System as root user.
7. Run one of the following commands based on the shell environment where your database instance is located:
   - C shell: `db2cshrc`
   - Korn shell: `db2profile`

8. Run the backup executable (`essdb2b`) with the necessary arguments:
   
   ```bash
   essdb2b <production host node name> <temp filename>
   ```

**Partially Automated Backup**

A Partially Automated Backup uses a Tivoli Storage Manager Server Script to partially automate the online backup of a DB2 UDB database.

### Table 12. Files used during a Partially Automated Backup

<table>
<thead>
<tr>
<th>Filename</th>
<th>Description</th>
<th>Default Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>serverscript.smp.db2</td>
<td>Sample Server Script</td>
<td><code>/usr/tivoli/tsm/client/tdpess/db2</code></td>
</tr>
<tr>
<td>dbbackup</td>
<td>User Server Script</td>
<td><code>/usr/tivoli/tsm/server/bin</code></td>
</tr>
<tr>
<td>tmpfile</td>
<td>Temporary File</td>
<td><code>/usr/tivoli/tsm/client/tdpess/db2</code></td>
</tr>
<tr>
<td>setupfile.smp.db2</td>
<td>Sample Setup File</td>
<td><code>/usr/tivoli/tsm/client/tdpess/db2</code></td>
</tr>
<tr>
<td>db2setup</td>
<td>User Setup File</td>
<td><code>/usr/tivoli/tsm/client/tdpess/db2</code></td>
</tr>
</tbody>
</table>

1. Log on to the Production System as root user:
2. Copy the sample Setup File to `db2setup`:
   
   ```bash
   cp setupfile.smp.db2 db2setup
   ```
3. Edit `db2setup` with the appropriate Setup File parameter values:
   
   ```bash
   vi db2setup
   ```
   
   See "Setup File Parameters" on page 9 for available values.
4. Copy the sample Server Script (`serverscript.smp.db2`) to the Tivoli Storage Manager server directory as `dbbackup`:
   
   ```bash
   cp serverscript.smp.db2 /usr/tivoli/tsm/server/bin/dbbackup
   ```

---

5. After the backup executable (`essdb2b`) is run on a Backup System that has SDD installed, TDP for ESS removes the hdisk and vpath devices that correspond to the Target Volumes. In order to bring up the hdisk and vpath devices again, see "Restoring hdisks for SDD" on page 31.

6. You must edit your Server Script if you place the production executable (`essdb2p`) or backup executable (`essdb2b`) in a directory other than the TDP for ESS default installation directory (`/usr/tivoli/tsm/client/tdpess/db2/bin`). See "Editing Your Server Script" on page 31 for more information.
5. Log on to the server with the Tivoli Storage Manager Administrative Client by entering this command:
   
dsmadmc

6. Define dbbackup on the server with the server command, define script:
   
   SERVER>define script dbbackup file=/usr/tivoli/tsm/server/bin/dbbackup
   
   Leave this Tivoli Storage Manager Administrative Client active and proceed to the next step.

7. Log on to the Production System as root user.

8. Start the client scheduler on the Production System with this command:
   
dmc schedule

9. Log on to the Backup System as root user.

10. Start the client scheduler on the Backup System with this command:
    
dmc schedule

11. Use the active Tivoli Storage Manager Administrative Client to run dbbackup with the server command, run:
    
    SERVER>run dbbackup <production host node name> <setup filename> <backup host node name> <temp filename>

### Fully Automated (Scheduled) Backup

A Fully Automated Backup uses a Server Script\(^7\) with the Tivoli Storage Manager scheduler to fully automate online backups of DB2 UDB databases.

#### Table 13. Files used during a Fully Automated Backup

<table>
<thead>
<tr>
<th>Filename</th>
<th>Description</th>
<th>Default Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>serverscript.smp.db2</td>
<td>Sample Server Script</td>
<td>/usr/tivoli/tsm/client/tdpess/db2</td>
</tr>
<tr>
<td>dbbackup</td>
<td>User Server Script</td>
<td>/usr/tivoli/tsm/server/bin</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Note that this is the server directory to which dbbackup will be copied in Step 7.</td>
</tr>
<tr>
<td>tmpfile</td>
<td>Temporary File</td>
<td>/usr/tivoli/tsm/client/tdpess/db2</td>
</tr>
<tr>
<td>setupfile.smp.db2</td>
<td>Sample Setup File</td>
<td>/usr/tivoli/tsm/client/tdpess/db2</td>
</tr>
<tr>
<td>db2setup</td>
<td>User Setup File</td>
<td>/usr/tivoli/tsm/client/tdpess/db2</td>
</tr>
</tbody>
</table>

---

\(^7\) You must edit your Server Script if you place the production executable (essdb2p) or backup executable (essdb2b) in a directory other than the TDP for ESS default installation directory (/usr/tivoli/tsm/client/tdpess/db2/bin). See ["Editing Your Server Script" on page 31](#) for more information.
1. Log on to the Production System as root user.

2. Copy the sample Setup File to db2setup:
   
   ```
   cp setupfile.smp.db2 db2setup
   ```

3. Edit db2setup for the appropriate Setup File parameter values:
   
   ```
   vi db2setup
   ```

   See "Setup File Parameters" on page 9 for available values.

4. Start the client scheduler on the Production System with this command:

   ```
   dsmc schedule
   ```

5. Log on to the Backup System as root user:

6. Start the client scheduler on the Backup System with this command:

   ```
   dsmc schedule
   ```

7. Copy the sample Server Script (serverscript.smp.db2) to the Tivoli Storage Manager server directory as dbbackup:

   ```
   cp serverscript.smp.db2 /usr/tivoli/tsm/server/bin/dbbackup
   ```

8. Log on to the server with the Tivoli Storage Manager Administrative Client by entering this command:

   ```
   dsmadmc
   ```

9. Define dbbackup on the server with the server command, define script:

   ```
   SERVER>define script dbbackup file=/usr/tivoli/tsm/server/bin/dbbackup
   ```

10. Define an administrative command schedule for dbbackup with the server command, define schedule:

    ```
    SERVER>define schedule <schedule_name> type=admin active=yes cmd="run dbbackup <production host node name> <setup filename> <backup host node name> <temp filename>"
    ```

---

**Backup Strategy Requirements**

The following backup strategy requirements must be met in order for TDP for ESS to function properly:

- You must use the same syntax as provided in the sample Setup File.

- A delay of four to five minutes might occur between the start of the server schedule and the start of the schedule on the client.

- The DB2 UDB engine must be available on the Production System and Backup System.
  The target database is created on the Production System only.

- The password file must be generated.

- If TDP for ESS is run using the scheduler, the dsmerror.log file is placed in the directory from which the scheduler is started or the value specified with the $DSM_LOG environment variable.
How to Restore Your Database

Restore your backed up database with the DB2 UDB restore procedure documented below.

Performing a Restore

DB2 UDB databases are restored as an entire database. This procedure assumes the database to be restored is named mydb.

1. Log on to the Production System using a DB2 ID with SYSADM, SYSCTRL, or SYSMAINT authority.

   Note: It is recommended that you copy transaction logs to a temporary directory to avoid possible deletion during a restore operation.

2. Export the DSMI_DIR and DSMI_CONFIG environment variables to reflect the configuration of the Backup System when the DB2 UDB database was backed up:

   export DSMI_DIR=/usr/tivoli/tsm/client/api/bin
   export DSMI_CONFIG=/usr/tivoli/tsm/client/api/bin/mydsm.opt

3. Change to the following directory:

   cd /home/<db2instance name>/sql1ib/adsm

4. Issue the following command to list the backed up mydb database on the Tivoli Storage Manager server:

   db2adutl query db mydb

5. Restore the latest backup version of mydb from the Tivoli Storage Manager server:

   db2 restore db mydb use tsm

   To restore a version of mydb backed up at a certain point-in-time, issue the command:

   db2 restore db mydb taken at <time stamp of backup copy in TSM> use TSM

6. Issue this command so no transactions are lost between the current state of mydb and the last backup:

   db2 rollforward db mydb to end of logs and complete

Restore Strategy Requirements

A DB2 UDB database is restored to one of the following locations:

1. DB2 UDB on the Production System.
   - The data can be sent directly over a local area network (LAN) to the Source Volumes on the Enterprise Storage Server. This is the standard restore.

---

8. This should be the directory where db2adutl is located.
2. DB2 UDB on the Backup System.
   - Data can be sent to the Target Volumes (or flashcopy volumes) on the Enterprise Storage Server.
If an error condition occurs during a TDP for ESS event, there are several sources of information you can view to help determine what the problem might be. The sources of information are listed below.

Log File Information

- TDP for ESS logs information, by default, to the `tdpess.log` file located in the default installation directory of TDP for ESS, or in the directory pointed to by `$DSM_LOG`. This file indicates the date and time of a backup, data backed up, and any error messages or completion codes. This file is very important and should be monitored daily.

- The Tivoli Storage Manager API logs API error information, by default, to the `dsierror.log` file in the default installation directory of the Tivoli Storage Manager API or the directory pointed to by `$DSM_API_LOG`.

- The `dsmerror.log` file is located in the default installation directory of the Tivoli Storage Manager Backup-Archive Client or the directory pointed to by `$DSM_LOG`. The `dsmsched.log` file is located in the default installation directory of the Tivoli Storage Manager Backup-Archive Client or the current working directory from where the `dsmc sched` command is issued.

DB2 UDB Connection Fails

Your DB2 UDB connection can fail due to various password or configuration problems. If your DB2 UDB connection fails, perform the following:

1. Log on to the Production System as `root` user.
   a. Run the `db2 connect` command as follows:
      
      ```
      db2 connect dbname USER usrename USING usrpwd
      NEW usrename CONFIRM usrpwd
      ```

      **Note:** TDP for ESS only supports the `USER`, `USING`, `NEW`, and `CONFIRM` parameters with the `db2 connect` command.

2. Log on to the Backup System as `root` user.
   a. Make sure a database exists under your DB2 instance. If not, enter the following command to create a sample database called `SAMPLE` by default:
      
      ```
      db2sampl
      ```

   b. Run the `db2 connect` command to connect to your database:
      
      ```
      db2 connect <database name> USER usrename USING usrpwd
      NEW usrename CONFIRM usrpwd
      ```

   c. Stop the DB2 instance with the `db2stop` command.
d. Run the TDP for ESS backup executable (essdb2b) with the necessary arguments.

For more information, see your DB2 UDB documentation.

**Trace File Information**

You can locate connection error information by setting the `tracefile` and `traceflags` options in the `dsm.opt` files pointed to by DSM_CONFIG and DSMI_CONFIG. For example:

```bash
tracefile /home/tominst/trace.out
traceflags api api_detail appl
```

See *Tivoli Storage Manager Trace Facility Guide* for details about setting trace options.

If you receive the following error in your trace file:

"invalid userid/password"

Your UNIX user account password is invalid. This account contains the UNIX username and password used to create a DB2 instance on the Production System and Backup System in Step 2 and Step 3 on page 14. To resolve:

1. Change your current username to the UNIX account username:
   ```bash
   su <UNIX username>
   ```

2. Enter your password for the UNIX account username:
   ```bash
   passwd <UNIX username password>
   ```

"SQL2048N An error occurred while accessing object "3", Reason code "6"

More than one person is running the TDP for ESS production executable (essdb2p) simultaneously.

"Database mydb is not a recoverable database"

Your target database is considered a nonrecoverable database. To resolve, perform Step 7b and Step 7c on page 15.

2033 E DSM_RC_NO_NODE_REQD

If you receive this API Return Code, perform Step 1 and Step 2 of “DB2 UDB Connection Fails” on page 27.

**Customer Service**

If the sources of information listed above do not provide an answer to your problem, contact your IBM service representative. The IBM service representative can provide additional ways to gather diagnostic information. See the *Tivoli Customer Support Handbook* at the following Web site: http://www.tivoli.com/support/handbook

The handbook provides information about how to contact Tivoli Customer Support, depending on the severity of your problem, and the following information:

- Registration and eligibility
- Telephone numbers and e-mail addresses, depending on the country you are in
- What information you should gather before contacting support
Alternative Procedures

This appendix describes alternative procedures to adjust TDP for ESS to your production environment. These procedures are:

- Configuring System Options Files to the Same Server
- Configuring Multiple Server Stanzas
- Editing Your Server Script
- Restoring hdisk for SDD
- Recovering a DB2 UDB Database from the Backup System

Configuring System Options Files to the Same Server

The following procedure demonstrates how to configure system option files (dsm.sys) to point to the same server. In these examples, the client user options files (dsm.opt) in the /usr/tivoli/tsm/client/ba/bin and /usr/tivoli/tsm/client/api/bin directories are defined for a server with a TCPIP address of arrow.sanjose.ibm.com.

**ba/bin Directory**

**Example: dsm.opt**

```
servername tdpess
```

**Example: dsm.sys**

```
servername tdpess
commmethod tcpip
tcporto 1500
tcpserveraddress arrow.sanjose.ibm.com
passwordaccess generate
schedmode prompted
```

**api/bin Directory**

**Example: dsm.opt**

```
servername tdpdb2
```

**Example: dsm.sys**

```
servername tdpdb2
commmethod tcpip
tcporto 1500
tcpserveraddress arrow.sanjose.ibm.com
passwordaccess prompt
```
Note: The servername option in the dsm.opt and dsm.sys files define server stanza names only. The tcpserveraddress option controls which server is actually contacted.

Configuring Multiple Server Stanzas

This procedure demonstrates how to configure multiple server stanzas in the system options file (dsm.sys).

1. Cut and paste the option settings from the DB2 UDB dsm.sys file to the TDP for ESS dsm.sys file. Below is an example of a combined dsm.sys for a server with the name arrow:

```
servername tdpess
commmethod tcpip
tcpport 1500
tcpserveraddress arrow.sanjose.ibm.com
passwordaccess generate
schedmode prompted

servername tdpdb2
commmethod tcpip
tcpport 1500
tcpserveraddress arrow.sanjose.ibm.com
passwordaccess prompt
```

Editing Your Server Script

A Tivoli Storage Manager Server Script contains the necessary client steps to coordinate a Partially Automated Backup or a Fully Automated Backup. You must edit your Server Script if you place the production executable (essdb2p) or backup executable (essdb2b) in a directory other than the TDP for ESS default installation directory (/usr/tivoli/tsm/client/tdpess/db2/bin).

TDP for ESS provides a sample Server Script (serverscript.smp.db2) in the /usr/tivoli/tsm/client/tdpess/db2 directory.

Server Script Parameters

The Server Script contains the following values:

- **$1** Specifies the Tivoli Storage Manager node name for the Production System.
- **$2** Specifies the fully qualified path and name of your Setup File. Your Setup File contains all necessary database information to successfully perform a backup. See "3. Create Your Setup File” on page 8 for more information.
- **$3** Specifies the Tivoli Storage Manager node name for the Backup System. The node name for the Backup System must be different from the node name for the Production System.
- **$4** Specifies the fully qualified pathname of the temporary file that Tivoli Storage Manager creates on the Production System. This temporary file contains information generated by TDP for ESS that is required for the Backup System. You do not need to edit or alter this file.

All parameters are required.
Example Server Script

Below is an example of the Server Script provided by TDP for ESS.

```plaintext
define clientaction $1 wait=y action=command object="essdb2p $2 $3 $4"
if (error) goto end
if (rc_ok) goto next
exit
next:
define clientaction $3 wait=y action=command object="essdb2b $1 $4"
end:
exit
```

See “How to Back Up Your Database” on page 21 for information on how to define the Server Script on the Tivoli Storage Manager server and run the backup using this Server Script.

Restoring hdisk devices for SDD

After the backup executable (essdb2b) is run on a Backup System that has SDD installed, TDP for ESS removes the hdisk and vpath devices that correspond to the Target Volumes. In order to bring up the hdisk and vpath devices again, you must run the AIX `cfgmgr` command for every path on the SDD device. The output from the AIX `lsvpcfg` command may display fewer hdisk devices for the SDD device than actually exist. You can restore all the hdisks to the vpath device by issuing the following AIX commands:

1. Issue
   `rmdev -l <vpath#>`

2. Issue
   `mkdev -l <vpath#>`

3. Issue
   `lsvpcfg`

   All paths to the SDD device should now display.

Recovering a DB2 UDB Database from the Backup System

You can bring up a DB2 UDB database on the Backup System if the database was originally backed up with the `clear_target_pvid` parameter set to `no`. The following procedure describes how to recover a DB2 UDB database in this situation.

**Part I:** Log on to the Backup System as root user and perform the following:

1. Run the AIX `cfgmgr` command:
   `cfgmgr`

2. Identify the hdisks or vpaths associated with the PVIDs that are listed in your temporary file. You can do this in one of the following two methods:
   - Issue the AIX `lspv` command with the following arguments to list every PVID in the temporary file:
     `lspv | grep <pvid>`
   - Issue the AIX `lsvpcfg` command with the following arguments to list every PVID in the temporary file:
     `lsvpcfg | grep <pvid>`

---

9. These steps need to be done for all the Target Volumes.
Issue the AIX `lscfg` command with the following arguments to identify serial numbers associated with the hdisks or vpaths:

```
lscfg -v
```

Identify which of the returned serial numbers were specified as Target Volumes in the temporary file.

3. Issue the AIX `importvg` command with the following arguments for a representative set of hdisks, with one representative from each volume group:

```
importvg -f <hdisk#>
```

Volume groups named `vgXX` (where `XX` is a number assigned by the operation system) should display that were not present before you performed Step 3.

4. Mount every file system whose MOUNT_POINT is listed in your temporary file:

```
mount /myfs
```

where `myfs` is a file system with a mount point listed in your temporary file. Note that if your log path is in a file system other than the system directory, you must also mount that file system.

5. Issue the AIX `chown` command with the following arguments for each file system mounted in Step 4:

```
chown -R <DB2user>:<DB2group> <mount_point>
```

where

- `DB2user` is the DB2 instance owner
- `DB2group` is the primary group of the DB2 instance owner
- `mount_point` is the mount point for the file system

6. Open your temporary file and issue the AIX `chown` command with the following arguments for every raw device listed by the `database_rawtbsp` parameter:

```
chown <DB2user>:<DB2group> /dev/<raw device name>
```

where

- `DB2user` is the DB2 instance owner
- `DB2group` is the primary group of the DB2 instance owner
- `raw device name` is the name of the special file associated with the raw device

Note that if your log path is in a raw device, you must issue the AIX `chown` command for that raw device.

7. Exit the Backup System.

**Part II**: Log on to the Backup System as the DB2 instance owner and perform the following:

1. Run the `db2 catalog` command with the following arguments:

```
db2 catalog db <target_database_name> as <target_database_aliasname> on <target_database_mount_point>
```
where target_database_name, target_database_aliasname, and target_database_mount_point are the values specified by these parameters in the temporary file.

2. Run the \texttt{db2 list} command with the following arguments to verify that the target database is cataloged on the Backup System:
\begin{verbatim}
db2 list db directory
\end{verbatim}
Verify that the value of the catalog node number parameter for the target database is 0.
- If the value is 0, proceed to Step 3.
- If the value is not 0, uncatalog the database and review Step 1 through Step 7 to determine if you may have left out a procedure.

3. Run the \texttt{db2 rollforward} command with the following arguments:
\begin{verbatim}
rollforward db <target_database_aliasname> to end of logs and complete
\end{verbatim}
You should now be able to connect to the target database on the Backup System.

**IMPORTANT!**: Before running any additional TDP for ESS backups with the same target volumes, you must first perform the following "cleanup" procedure:

1. Log on to the Backup System as the DB2 instance owner.
2. Uncatalog the target database on the Backup System.
3. Exit the Backup System.
4. Log on to the Backup System as \texttt{root} user and perform the following:
   a. Unmount every file system that you mounted in Part I Step 4.
   b. Issue the AIX \texttt{varyoffvg} command for every volume group imported in Part I Step 3.
   c. Issue the AIX \texttt{exportvg} command for every volume group imported in Part I Step 3.
B

Return Codes

0

Explanation: The production executable (essdb2p) and backup executable (essdb2b) completed successfully.

User Response: None.

1

Explanation: Using a different API library. Note that this error is also sometimes returned when an operating system or DB2 UDB command fails.

User Response: Compatible API Libraries (Insert API, bit table) and check version. Also check trace file, tdpess.log, to determine if error is due to a failing operating system or DB2 UDB command. Based on the nature of the failing command, make sure the configuration is appropriate.

2

Explanation: Cannot find the Target Volumes.

User Response: In case of ESS, make sure the Target Volumes are in the same LSS as the Source Volumes and are available to the Backup System. Check syntax errors in the Setup File for typos in any of the following parameters:

- shark_target_volume
- shark_copy_service_code
- java_home_directory
- primary_copyservices_servername
- shark_username
- shark_password

3

Explanation: Either the Target Volumes or the Source Volumes are in the root volume group.

User Response: Make sure the Target Volumes and Source Volumes are not in the root volume group.

4

Explanation: The flashcopy command failed. This could be due to various reasons:

- the Copy Services CLI package may be missing some library/jar files
- the Source Volumes or Target Volumes are already in another flashcopy relationship
- the CLI package and Copy Services microcode are not in sync

User Response: If the CLI package is missing files, reinstall the CLI package. If the Source Volumes or Target Volumes are in another flashcopy relationship, wait until the concerned volume exits the relationship or use another Target Volume. If the CLI package and Copy Services microcode are not in sync, check with the Enterprise Storage Server administrator to obtain the appropriate level of Copy Services CLI and microcode.
Explanation: A different set of Target Volumes was previously associated with the same Source Volumes.

User Response: Perform one of the following:
Delete the disk on the Backup System only:
1. Find the disk using the AIX `lspv` command.
2. Run `smitty` and choose the following from the menu: Devices->Fixed Disk->Remove a Disk->Select the disk to be removed
3. Press Return.

Clear the PVID of each offending physical volume (hdisk) by issuing the AIX `chdev` command with the following arguments:
```
chdev -l <hdisk#> -a pv=clear
```

Explanation: The DB2 UDB database is mounted in read only mode.

User Response: Make sure the DB2 UDB database is not mounted in read only mode.

Explanation: The production node name or backup node name is not registered on the Tivoli Storage Manager server.

User Response: Make sure that the production node name and backup node name are registered on the Tivoli Storage Manager server:

- The production side node name is the node name listed when running `dsmc q f` on the production side, and is passed as the first argument to the backup side executable.
- The backup side node name is the node name listed when running `dsmc q f` on the backup side, and is passed as the second argument to the production side executable.

Explanation: The volume is not supported.

User Response: Make sure that the volume is supported.

Explanation: The file system that contains the DB2 UDB database is not a supported file system.

User Response: Make sure that the file system is supported.

Explanation: A table space name cannot be received from the DB2 UDB database.

User Response: Make sure the DB2 UDB installation is correct, and that the Setup File points to the correct locations.
13 Explanation: The volume disk ID cannot be found.
User Response: Make sure that the disk ID is correct.

14 Explanation: The mount point is not available.
User Response: Make sure that the mount point exists.

15 Explanation: An unidentified problem exists with the AIX volume manager.
User Response: Make sure the AIX volume manager is working appropriately.

17 Explanation: The command line string is longer than 255 characters.
User Response: Make sure that each string in the command line is no longer than 255 characters.

19 Explanation: There are invalid parameter values in the Setup File.
User Response: Make sure that parameter values in the Setup File are valid.

20 Explanation: The size of the Target Volume specified by the `shark_target_volume` parameter in the Setup File is incorrect.
User Response: Make sure size of the Target Volume specified by the `shark_target_volume` parameter in the Setup File is correct. If you are not sure of the exact size of the Target Volume, specify a dash (--) for the Source and Size values. TDP for ESS will automatically determine the size of the Target Volume.

22 Explanation: Target Volumes are not found on the Backup System. This may be the result of several DB2 UDB databases being simultaneously backed up from the same Backup System by TDP for ESS.
User Response: Make sure the Target Volumes are visible to the Backup System. If several DB2 UDB databases are being backed up simultaneously, try performing individual backups sequentially.

23 Explanation: One of the following situations exists:
- The servers specified by the `primary_copyservices_servername` and `backup_copyservices_servername` parameters in the Setup File are not available.
- The server specified by the `primary_copyservices_servername` parameter in the Setup File is not available and a backup server has not been specified by the `backup_copyservices_servername` parameter.
User Response: Make sure that at least one of these Copy Services servers is available. If the primary Copy Services server is not available, make sure a backup Copy Services server is available and specified by the `backup_copyservices_servername` parameter.
**50**

**Explanation:** The wrong license file exists.

**User Response:** Check if there is a mismatch between the executable (essdb2b or essdb2p) and the license file (agent.lic). For example, if you are using an old executable with a recent license file or vice versa.

---

**102**

**Explanation:** Memory space has been exceeded.

**User Response:** Increase the memory space or reboot the system.

---

**104**

**Explanation:** The file you are trying to use does not exist.

**User Response:** Make sure that the file you are trying to use exists.

---

**115**

**Explanation:** A value for a required parameter in the Setup File has not been specified. This may also be caused by a space existing between a parameter and the colon (:) in the Setup File.

**User Response:** Make sure all the required parameters are present in the Setup File and that no space exists between a parameter and the colon (:).

---

**255**

**Explanation:** The Backup System has a file system with the same name as the DB2 UDB database on the Production System, and the file system is also mounted on the Backup System.

**User Response:** Make sure that a file system with the same name as the DB2 UDB database does not exist on the Backup System.
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Spine information:

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