

IBM Tivoli Service Offering



# **ADINT/TSM**

# **for SAP MaxDB**

**Installation & User's Guide**

*Version 2 Release 4.1*

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Before using this information and the product it supports, be sure to read the general information under 'Notices'.

### **Seventh Edition (December 2009)**

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## Preface

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### Who should read this book

This manual is intended for system programmers and administrators who are responsible for implementing a backup/restore solution for SAP MaxDB® (SAP MaxDB) using the IBM Tivoli Storage Manager® (TSM). It describes the procedures to install and customize ADINT/TSM, the interface between SAP MaxDB and TSM. This interface works with SAP MaxDB without being restricted to a particular application. Many specific references in this document, however, refer to the SAP R/3® environment, as this is a key usage area for SAP MaxDB backup/restore with TSM.

The reader should be familiar with the SAP MaxDB documentation, especially as it refers to the backup/restore utilities within the database administration tool Database Manager CLI (DBMCLI). For more information about SAP MaxDB, refer to the SAP MaxDB home page at [https://www.sdn.sap.com/irj/sdn/SAP MaxDB](https://www.sdn.sap.com/irj/sdn/SAP%20MaxDB).

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### Contents of the ADINT/TSM Package

The ADINT/TSM install package includes this manual, a release notice and install program with machine readable material for download or on a CD-ROM.

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### Supported Platforms

For a list of supported platforms see the Release Notice (RELNOTE), contained in your ADINT/TSM package or available via download from the ADINT Web site.

<p><b>Note:</b> Unless otherwise stated, references in this publication to UNIX® apply to all supported UNIX-based systems as well as to Linux®, and references to Windows® apply to Windows 2003/2008 .</p>
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### Platform Differences

There are little differences between the UNIX and the Windows versions of ADINT/TSM. One of these differences is that UNIX uses the path separator “/” compared with “\” for Windows and that the drive letter is specified for Windows. Non-trivial differences between the UNIX and Windows versions of ADINT/TSM will be mentioned explicitly.

# Chapter 1. Introducing ADINT/TSM

ADINT/TSM is an intelligent client/server program to support backup/restore of SAP MaxDB® databases using the IBM Tivoli Storage Manager® (TSM).

ADINT/TSM seamlessly connects SAP MaxDB with TSM to combine proven database administration utilities with the state-of-the-art storage management capabilities of TSM.

Administrators can deploy established database backup/restore processes like

- full database backup online or offline, with or without checkpoint
- incremental backup (changes since last full backup)
- log backup

and take advantage of TSM's automated and scalable functions for managing the backup storage.

Non-database files, e.g. SAP system files or other applications' data, can be backed up using TSM standard backup/archive client functionality for file system files, like incremental backup, file filtering, point-in-time recovery, etc.

## 1.1 Architecture of ADINT/TSM

ADINT/TSM serves as interface between the SAP MaxDB and one or multiple TSM servers. Data from or to SAP MaxDB will be transferred via named pipes whereas data from or to the TSM server will be sent via the TSM API typically over a LAN (with the network protocol TCP/IP).

The SAP MaxDB backup process will be started directly from the database manager, *DBM*, either with *DBMCLI*, *DBMGUI* or *WEBDBM* as shown in fig. 1.

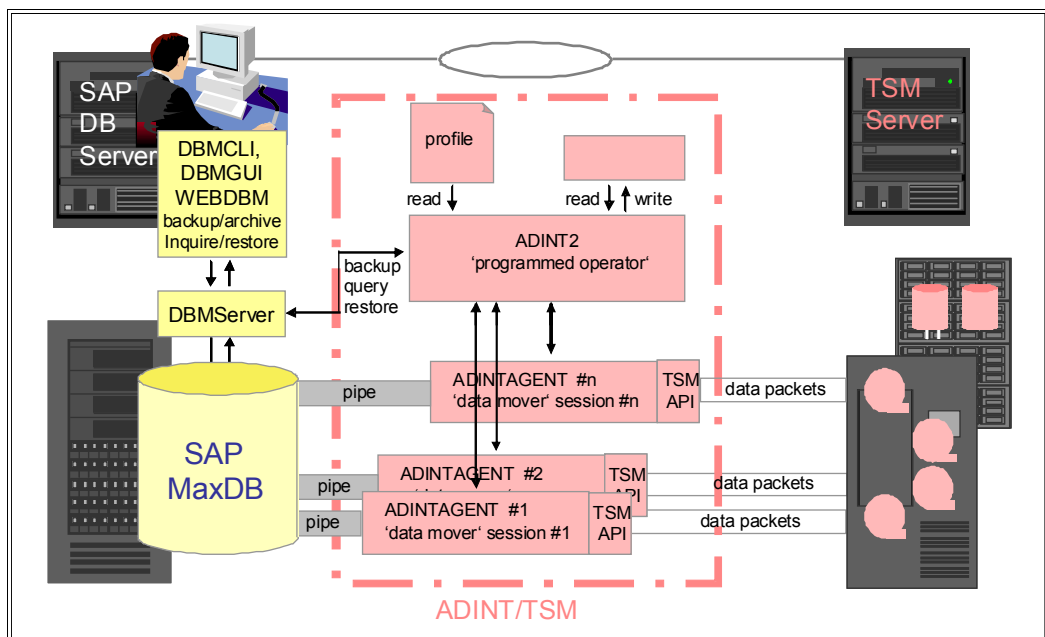


Figure 1. Overview of ADINT/TSM

The *DBMServer* process recognizes ADINT/TSM as external backup utility and starts it. The pipe(s) for transferring the data are implicitly created by the *DBM* for the database instance during the backup or restore process. They must therefore not permanently exist. ADINT/TSM consists of two executables: *ADINT2* is the supervisory process ('programmed operator') which controls the backup and restore operations, and *ADINTAGENT* is the data mover process.

After ADINT/TSM has been started from SAP MaxDB, *ADINT2* sets up the operation and then starts each session with its *ADINTAGENT* reading/writing data from/to the created pipe (one pipe per agent) and transferring the data to/from the TSM server.

In case of restore, *DBMServer* first issues a ADINT/TSM query command to obtain all backup IDs from ADINT/TSM stored in TSM. The administrator can then select a backup copy to be restored.

The ADINT/TSM architecture has been designed based on the top two business requirements

1. robust and dependable operation
2. minimum downtime and impact on productive operation

and therefore provides the following **outstanding features**

- 1) database is single point of control to ensure backup completeness and consistency
- 2) SAP MaxDB metadata for retrieval, e.g. Backup ID, and backup data are stored together in TSM as an inseparable relation (using the TSM archive function)
- 3) data are transferred directly between SAP MaxDB and TSM in a single step process without intermediate data storing and its associated delays and administration overhead
- 4) data transfer can be parallelized wherever possible to increase overall throughput

## ADINT/TSM Profile

ADINT/TSM can be adapted to the environment specific needs through customization in a profile (*initSID.utl*) with parameters such as e.g. target TSM server, TSM management classes, number of backup generations to be kept, and others. For more detail see Appendix B. "ADINT/TSM Profile" on page Fehler: Referenz nicht gefunden.

The profile is analyzed on each ADINT/TSM call before any commands are issued to TSM.

## ADINT/TSM Configuration File

Internal parameters which ADINT/TSM uses and modifies are stored in a separate binary configuration file (*internparamfile.adi*) for continuing later use. Among other information, this file contains (in encrypted form)

- the version count for the ADINT/TSM function backup deletion by generation, see "Backup deletion by limiting the number of backup generations" on page 15
- the TSM server password, see "Password Handling" on page 49
- the usage key, see "Usage Key Handling" on page 28.

Functional enhancements may necessitate changes in this file between releases, see Release Notice or README, chapter "Upgrade/Compatibility" of the respective new release.

**Note:** The configuration file can only be changed with ADINT/TSM commands. Never change this file manually, else ADINT/TSM might become inoperable.

## 1.2 Key Functions of ADINT/TSM

The following section presents an overview of the major functions and underlying concepts delivered specifically by ADINT/TSM on top of the TSM capabilities.

The functions are sorted by these main focus areas

1. short backup/restore windows (rate of data transfer SAP MaxDB – TSM)
2. availability (recovery from problems)
3. productivity (administration and resource consumption)

The various functions can be activated or customized by parameters in the ADINT/TSM profile. More information in detail will be provided in the appendix in chapters describing the profile or dedicated capabilities.

### Short Backup/Restore Windows

ADINT/TSM deploys parallelism to maximize the overall data throughput, see fig. 2. As several components participate serially in the data transfer, data throughput is dependent upon the weakest link in this chain. Increasing data throughput therefore requires analysis to identify the bottleneck before effective improvement measures can be applied.

The following functions can be used individually or in combination, see also fig. 2.

#### Parallel Backup/Restore Sessions

ADINT/TSM can execute parallel data streams (sessions) between SAP MaxDB and TSM. A session consists of a SAP MaxDB pipe, an ADINTAGENT data mover and a storage device of the TSM server, see 'single session' in fig. 2.

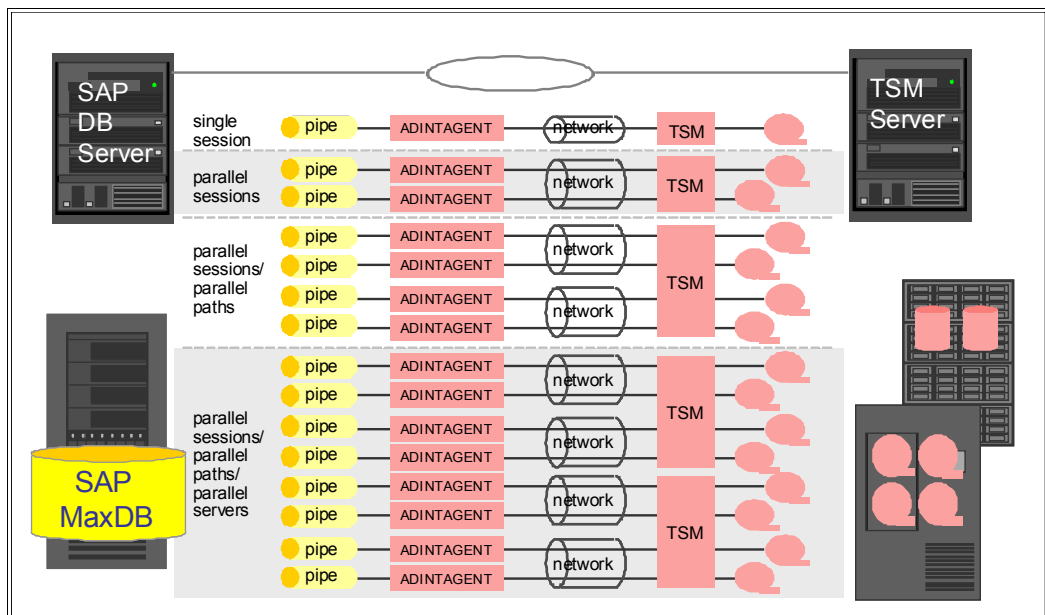


Fig. 2 Parallelism of Data Transfer

**Note:** A backup process can only use as many sessions as there physical storage devices (tape drives) available.  
One SAP MaxDB pipe must be opened per session (using the *DBMCLI*).

## Parallel Paths

If the network bandwidth is the bottleneck limiting data throughput, ADINT/TSM can be set up to execute data transfers across multiple network connections in parallel, see fig. 2. As a prerequisite, the TSM server must be accessible under multiple network addresses. In order to distribute the load across network connections with different speeds, the number of parallel sessions can be specified for each path individually.

Appendix D. "Alternate/Parallel Paths and Servers" on page 51 describes this feature in more details and shows several profile examples how to set up ADINT/TSM for Parallel Paths.

## Parallel Servers

This function is similar to Parallel Paths, except that now multiple TSM servers operate in parallel on one backup or restore job. ADINT/TSM distributes backup data across the configured set of TSM servers and keeps track of which part of a backup is stored on which TSM server.

Appendix D. "Alternate/Parallel Paths and Servers" on page 51 describes this feature in more detail and shows several profile examples how to set up ADINT/TSM for Parallel Servers.

## Performance Features

ADINT/TSM is designed for maximum throughput not only through

- 1) single step data transfer without intermediate storing
- 2) support for parallelism of data transfer

but also through a highly performant code structure: large internal buffers and multithreading exploit the power of today's multiprocessor systems. Read and write threads (disk and network I/O) from/to data blocks in the buffers are running concurrently and can be executed on different processors of an SMP system.

## Availability

The following functions can be used individually or in combination.

### Duplicate Log Copies (new in this release!)

Log data are key for a database recovery to a specific point in time, e.g. just prior to a failure, sync point with other applications. They also allow restores from an older backup if a more recent one is unavailable.

In support of optimizing backup processes for the critical Log data ADINT/TSM can be set up to automatically backup 2 copies of each Log file(s) to compensate for media errors as well as problems in accessing the TSM server or storage device. The concept of the 'Duplicate Copies' feature is shown in fig. 3 below.

More detailed info can be found in APPENDIX E. Duplicate LOG Copies", page 58 .

The destination for the duplicate Log copies is defined by corresponding profile entries for the parameter LOGMANAGEMENTCLASS.

In case of restoring duplicate Log copies ADINT/TSM first tries to access the first copy (first LOGMANAGEMENTCLASS definition in the profile). If it cannot be accessed, ADINT/TSM automatically tries to read from the second copy. Thus the need for human intervention during the restore process is minimized.

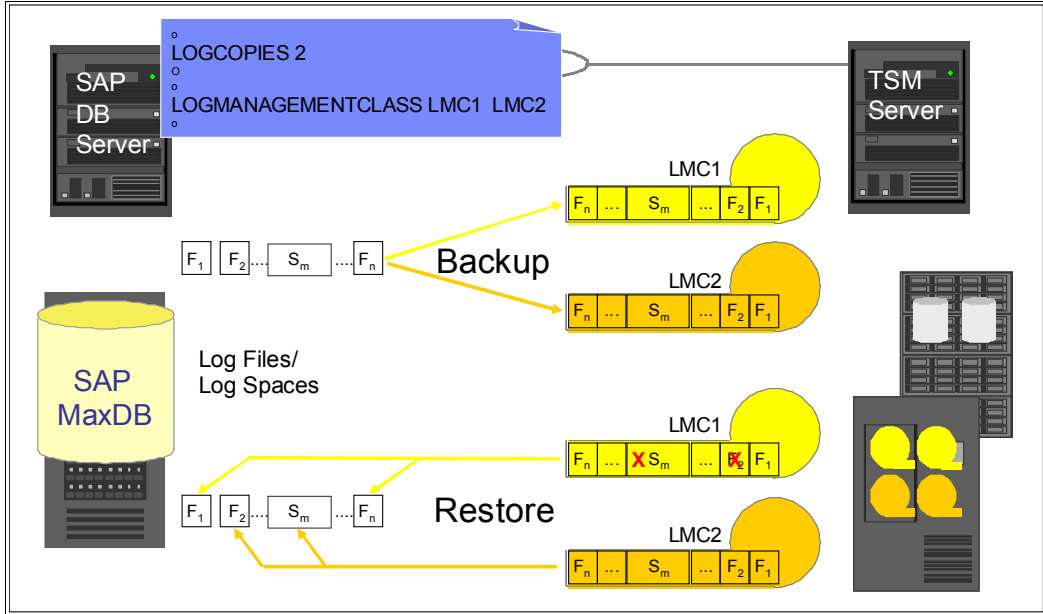


Fig. 3 Duplicate Log Copies

Backup destinations for the duplicate copies must be selected based on protection and infrastructure capabilities as outlined in the table below.

duplication level	failure coverage	parameter
Storage device/media remote storage device copy to vault (manual)	hardware failures/material defects + 'disaster' depending on distance + disaster depending on distance	LOGMANAGEMENTCLASS (2)
complete TSM server remote server	software/hardware/material defects + disaster dep. on distance	Multiple Servers (2), each with LOGMANAGEMENTCLASS (1)
network SAP MaxDB–TSM server	network problems	Alternate Paths (same Server) LOGMANAGEMENTCLASS (2)

Table 1 Log Backup destinations

**Note:** Make sure you have defined different backup destinations for original and duplicate Log copy (different LOGMANAGEMENT classes).  
For best protection it is recommended to backup Log files right after they have been archived by SAP MaxDB.

## Alternate Paths/Servers

ADINT/TSM supports multiple paths/servers not only in parallel, but also in alternating operation. Alternate Paths/Servers improves the availability of the (usually unattended) backup/restore process through scheduling data transfers only on operational connections/servers and discarding non-operational ones.

The setup for alternate and parallel paths/servers is very much alike. The session assignment controls which function is performed. For Alternate Paths, for example, the total number of sessions gets defined for each path. ADINT/TSM will check each connection in the order defined in the profile and schedule all sessions on the first one it finds operational. Alternate servers are handled in the same way.

For more information see 'Appendix D. Alternate/Parallel Paths and Servers', page 51.

## Productivity

### Multiple Management Classes

SAP MaxDB generates different objects for backups with different characteristics, e.g. volume, frequency, etc. To optimize use of storage these objects should get different storage technologies/devices assigned, which are defined in the TSM server management classes, refer to the *Administrator's Guide for Tivoli Storage Manager*.

- ADINT/TSM distinguishes between the several SAP MaxDB backup types, such as
- SAVEDATA, SAVEDTNCHK                      data files, full backup
  - SAVEPAGES, SAVEPGNCHK                  data file changes, incremental backup
  - SAVELOG                                      Log files

and automatically selects different management classes for different objects as defined in the profile, see Appendix B. "ADINT/TSM Profile" on page 44.

Most commonly used are different management classes for data files vs Log files:

- 1) data files have large volumes and are usually backed up to tape (cost of media and performance).
- 2) Log files are much smaller and backed up more frequently, for best protection right after they are archived. To avoid excessive tape mounts they are backed up to a hierarchical storage pool – first to disk, then in larger batches to tape (using threshold triggered migration within TSM).

## Backup Expiration

Two functions can be deployed alternatively to have the backup repository managed to a reasonable size by automatically expiring aged backup data:

- Deletion by limiting the number of backup generations

ADINT/TSM can be set to delete complete backup generations. Each backup object belonging to the same backup generation gets a unique number (version count) assigned in the object description of TSM. Every time a new full backup completes successfully, the version count is incremented by one and stored in the ADINT/TSM configuration file. This version count is assigned to the new full backup plus all subsequent incremental and Log backups.

The oldest versions (full backup with corresponding incremental and Log backups) will be deleted until only the specified maximum number (`MAX_VERSIONS` in the ADINT/TSM profile) of the more recent versions remain in the backup repository.

- Deletion by age

TSM server deletes backup objects by age based on a parameter `RETVER`, which for a copy group defines after how many days (archived) files should be expired (see Policy Definition” on page 19). If you use ADINT/TSM versioning, you need to bypass this expiration function. If you use the TSM expiration function, you need to turn off ADINT/TSM versioning.

**Note: Use only one of the above methods, be sure the other is deactivated!**

If you use version deletion (**ADINT/TSM**), set the TSM parameter

**RETVER=9999** to deactivate TSM file deletion.

If you use **file expiration (TSM)**, set the ADINT/TSM parameter

**MAX\_VERSIONS=0** to deactivate ADINT/TSM version deletion.

## Reporting

ADINT/TSM process results are logged into a file. For details, refer to Appendix A “ADINT/TSM Messages” on page 37.

## Tracing

ADINT/TSM can write trace information into a file to help analyze problems effectively. Contact your ADINT/TSM support before you activate this function.

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## Chapter 2. Tivoli Storage Manager Setup

This chapter gives an overview of TSM and explains the procedures to set it up for ADINT/TSM in an SAP environment by discussing a typical activities for an installer or administrator. The examples used may need environment-specific modifications.

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### 2.1 Tivoli Storage Manager

TSM is the core product of the Tivoli Storage Management product set. It provides a solution for distributed data and storage management in an enterprise network environment. TSM currently protects and manages data on a broad range of operating platforms, covering mobile, desktop and server systems distributed over the entire world. It is integrated with hundreds of storage devices as well as with LAN, WAN, and SAN interconnection technologies. The base functions provided by TSM and its complementary products include:

#### Data Protection

- **Operational Backup and Restoration of Data:** The backup process creates a copy of the data to protect against operational loss or destruction of files or application information. You can define how the data is backed up, e.g. frequency, media, and how the backups are managed over lifetime. The restore process places the backup copy of the data into a customer-designated system or workstation.
- **Disaster Recovery:** This involves all activities for organizing, managing and automating the recovery process after a major loss of IT infrastructure and data across the enterprise. This includes processes for moving data off-site into a secure vault location, for rebuilding IT infrastructure, and for enabling data to be successfully restored in an acceptable time frame.

#### Storage Resource Management

- **Vital Record Retention Archive and Retrieval:** The archival process creates a copy of a file or a set of files representing an end point of a process for long term storage. Files can remain on the local storage media or can be deleted. The customer controls how long (retention period) an archive copy is to be retained. The retrieval process locates the copies within the archival storage and places them back into a customer-designated system or workstation.
- **Hierarchical Space Management:** This process provides automatic and transparent movement of operational data from the user system disk space to a central storage repository. If the user accesses this data, it is dynamically and transparently restored to the client storage.

These functions are network based, which means they are available to the entire networked infrastructure. Functions can be automated to be performed in a 24x7 lights-out operation. Administration costs are minimized by centralizing the management of all TSM components.

TSM publications are available in the Tivoli Storage Manager Information Center at <http://www.ibm.com/software/tivoli/products/storage-mgr>

Additional information can be found in manuals such as the *Administrator's Reference for Tivoli Storage Manager* or the *Administrator's Guide for Tivoli Storage Manager*.

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## 2.2 Configuration of Tivoli Storage Manager Server

This section shows the procedure for setting up the TSM server. General server configurations will be described first, followed by specific server configurations, such as setup of storage devices.

The TSM commands presented in this chapter are shown in full for ease of understanding. In the TSM command line interface, short cuts or abbreviations for all commands and parameters can be used for convenience. TSM also has a Web-browser-based Graphical User Interface (GUI).

### General

Before starting the installation, some important performance issues should be considered. The careful choice of the server that is to be installed, the network topology, and the use of powerful hardware can improve performance within the system landscape and can avoid performance bottlenecks.

- **Host for TSM server.** The TSM server should be installed on a dedicated system to provide for recovery capability when the application server is down. In a uniform SAP system landscape, a single TSM server may be sufficient. In heterogeneous environments, where critical systems with large databases and file servers with large numbers of small files have to be backed up, it is essential to plan for an adequate server capacity and periphery or to distribute the different loads onto several TSM servers.
- **Network topology.** Local Area Network topologies such as Ethernet, FDDI, Fast Ethernet/Gigabit Ethernet work well with TSM. In general, the fastest network topology like Gigabit Ethernet should be used to prevent bottlenecks during backup/restore operations. TSM supports multiple network adapters, increasing server throughput by providing multiple connections to the same network or several physically distinct networks with the same server. TSM for Storage Area Networks (SAN) exploits state-of-the-art SANs. SAN-connected servers and clients can make maximum use of its high-bandwidth direct connection to storage, removing data transfer from the LAN.

### Prerequisites

It is assumed that the TSM server has already been successfully installed and the following steps executed:

1. TSM server has been installed.
2. Recovery log volume has been allocated and initialized.
3. Recovery log mirror volume has been allocated and initialized.
4. Database volume has been allocated and initialized.
5. Database mirror volume has been allocated and initialized.

6. Additional labeled volumes for the backup and archive storage pools have been allocated and initialized (disks, tapes or combinations).
7. Licenses have been registered.
8. The TSM server has been started.

For information on installing TSM, see the 'Tivoli Storage Manager Quick Start' manual.

**Note:** The latest code releases for Tivoli Storage Manager can be found at:  
<ftp://index.storsys.ibm.com/tivoli-storage-management/maintenance>

## Storage Device Setup

A storage device defines a device class, which will handle one type of media, e.g., tape libraries or jukeboxes. There is a default device class defined for disks called `DISK` which avoids the need for a redefinition.

For proper storage device setup, check the following items established within the TSM server during the installation procedure:

1. Query defined library

```
q library
```

2. Query defined drives

```
q drive
```

3. Query defined device class

```
q devclass
```

## Storage Pool Definition

A storage pool is a named collection of storage volumes that are associated with one device class. Each storage pool represents a collection of volumes that are the same media type. The storage pool setup defines the storage hierarchy for the appropriate environment.

In a SAP environment, there are different kinds of data to be backed up. These are system data and database data.

To define storage pools within the TSM server, log on as TSM Administrator using the *Admin Command Line* or the *Web Admin* and invoke the following commands:

1. Definition of a storage pool for the SAP system data

```
define stgpool sap_incr <device_class_name> maxscr=5
```

2. Definition of a storage pool for the data devspace

```
define stgpool sap_db <device_class_name> maxscr=20
```

### 3. Definition of a storage pool for log devspace

```
define stgpool sap_log <device_class_name> maxscr=3
```

**Note:** For tape library device, you have to define the maximum available number of *scratch volumes* (labeled volumes, which are empty or contain no valid data), this storage pool will be allowed to use (parameter `maxscr`). The maximum number of scratch tapes depends on the size of the database, the capacity of the tapes, the number of scratch volumes available and how many versions of backups you will keep. Replace these values with your estimate.

## Policy Definition

TSM policies will be used to specify how files are backed up, archived, migrated from client node storage, and managed in server storage.

A policy definition includes the definition of a *policy domain*, a *policy set*, *management classes* and *copy groups*. After the definition phase, you need to assign a default policy set and validate and activate it.

For the policy definition, log on as a TSM administrator using the *Admin Command Line* or the *Web Admin* and invoke the following commands:

#### 1. Policy domain and policy set definition

```
define domain sap_c21 define policyset sap_c21 p_c21
```

#### 2. Management Class definition for file system backups, data files, offline redo logs and copies of offline redo logs

```
define mgmtclass sap_c21 p_c21 mdefault  
define mgmtclass sap_c21 p_c21  
define mgmtclass sap_c21 p_c21 mlog
```

**Note:** When using one TSM server with multiple SAP systems, it is recommended to use a set of different management classes for each system.

#### 3. Copy Group definition

```
define copygroup sap_c21 p_c21 mdefault type=backup dest=sap_incr  
define copygroup sap_c21 p_c21 mdefault type=archive  
    dest=archivepool  
define copygroup sap_c21 p_c21 mdb type=archive dest=sap_db  
    retver=9999  
define copygroup sap_c21 p_c21 mlog type=archive dest=sap_log  
    retver=9999
```

ADINT/TSM only backs up to management classes for which an archive copy group has been defined (parameter `type` set to `archive`). In addition, to prevent backed up files within TSM being deleted because of their expiration date (TSM deletes expired files), the copy group parameter `retver` (specifies the number of days a file is to be kept) should be set to unlimited (9999).

4. Assigning the default management class

```
assign defmgmtclass sap_c21 p_c21 mdefault
```

5. Validating and activating the policy set

```
validate policyset sap_c21 p_c21
activate policyset sap_c21 p_c21
```

## Node Definition

The TSM server only views this clients, application clients, host servers and source servers as entitled to its services which are registered nodes.  
To register a node within TSM, log on as TSM administrator using the *Admin Command Line* or the *Web Admin* and invoke the following command:

```
register node C21 <passwd> domain=sap_c21 maxnummp=8
```

**Note:** A maximum number of mount points, i.e. tape drives, gets assigned by a server for access by each of its nodes: `maxnummp` (default 1). To enable ADINT/TSM to use parallel sessions, `maxnummp` must be at least equal to the number of parallel sessions.

---

## 2.2 Configuration of TSM Clients

The standard TSM Backup/Archive client is intended for use with file system backup, archive, restore, and retrieve services.  
Application-integrated TSM front-ends, like Tivoli Data Protection modules or ADINT/TSM, use the TSM API client to communicate with the TSM server.

### General

At first TSM Backup/Archive clients and API clients must be installed on all systems interfacing with the TSM server. For full protection of an SAP system the TSM Backup/Archive client should be installed on every machine with a file system backup requirement, e.g. each SAP database and application server and user workstation.

The TSM API client only needs to be installed on the SAP database server for SAP MaxDB backup/restore operations with the interface program ADINT/TSM.

**Note:** When the TSM API client is installed on UNIX systems, ensure that there is a soft link `/usr/lib/libApiDS.a` pointing to the `libApiDS.a` file in the installation directory (`/usr/tivoli/tsm/client/api/bin`) of the TSM API.

The setup for the TSM client is performed

- 1) in UNIX environments by customizing the files `dsm.opt` and `dsm.sys`
- 2) in Windows environments by customizing the file `<server_a>.opt` (where `server_` is a logical server name, see "TSM Clients on Windows Systems" on page 22).

The TSM client, backup/archive as well as API, requires write authority to an Error log file. There are several ways to identify the location of this file.

For more information on this topic see the following Technotes

'Order TSM uses to determine Error log location':

[http://www-01.ibm.com/support/docview.wss?](http://www-01.ibm.com/support/docview.wss?rs=1019&context=SSSQWC&dc=DB560&dc=DB520&uid=swg21245225&loc=en_US&cs=UTF-8&lang=en&rss=ct1019tivoli)

[rs=1019&context=SSSQWC&dc=DB560&dc=DB520&uid=swg21245225&loc=en\\_US&cs=UTF-8&lang=en&rss=ct1019tivoli](http://www-01.ibm.com/support/docview.wss?rs=1019&context=SSSQWC&dc=DB560&dc=DB520&uid=swg21245225&loc=en_US&cs=UTF-8&lang=en&rss=ct1019tivoli)

'ANS1078E occurred while setting password'

<http://www-01.ibm.com/support/docview.wss?uid=swg21218576>

We recommend to use the 'errorlogname' option: a variable 'errorlogname' in the `dsm.sys` (UNIX) or `<server>.opt` (WINDOWS) explicitly defines the Error log. An example for the definition can be found in Appendix J, 'Setup and Configuration Summary, 3) TSM API setup'.

**Note:** Make sure that the ADINT/TSM user has read AND write authorization for the `error.log` file, else ADINT/TSM will terminate with an error 'ANS1087E (RC106) Access to the specified file or directory is denied'.

An include/exclude list should be generated for the TSM Backup/Archive client. It defines which files it will include or exclude for backup, archive or hierarchical storage processes of file system files.

Examples of an include/exclude file for UNIX can be found in Appendix F. "Sample TSM Profiles (UNIX)" on page 58 and for Windows in Appendix G. "Sample TSM Profiles (Windows)" on page 60.

The following sections serve as a quick guide for configuring TSM. They provide a typical list of actions for a TSM administrator to prepare TSM for a SAP environment.

## TSM Clients on UNIX Systems

- 1) Install the TSM client software on the SAP database server machine.
- 2) Edit the client system options file `dsm.sys` and set the following values, as appropriate to your installation:

```
Servername          server_a
TCPPort             1500
TCPServeraddress    xxx.xxx.xxx.xxx
InclExcl            /usr/tivoli/tsm/client/ba/bin/inclexcl.list
Compression         OFF
```

- 3) Specify `TCPServeraddress 127.0.0.1` or `loopback` if server and client are installed on the same system to improve TCP/IP communication performance.
- 4) Specify `InclExcl` if you want TSM to include or exclude the files listed in `inclexcl.list`. This is optional. You would usually exclude all database files that were processed by the SAP MaxDB database backup.
- 5) If you have tape drives with hardware compression attached to the TSM server, you might get better throughput with the hardware compression than you would with the TSM client software compression (`Compression OFF`).
- 6) Edit the client user options file `dsm.opt` and set the following values:

```
LANGUAGE            AMENG (this is the default value)
NUMBERFormat        1      (this is the default value)
TAPEPROMPT          NO
TIMEFORMAT           1      (this is the default value)
```

## TSM Clients on Windows Systems

- 1) Install the TSM client software on the SAP database server machine.
- 2) For each logical TSM server you need a corresponding client option file. In the following example, the file name must be `server_a.opt` since `server_a` is the logical server name:

```
Servername          server_a
TCPPort             1500
TCPServeraddress    xxx.xxx.xx.xxx
InclExcl            c:\tivoli\tsm\baclient\inclexcl.list
Compression         OFF
```

In addition, the environment variables `DSM_CONFIG` and `DSMI_CONFIG` must point to the corresponding client options file, e.g., `c:\tivoli\tsm\baclient\server_a.opt`.

- 3) Specify `TCPServeraddress 127.0.0.1` or `loopback` if the server and client are on the same machine. This makes TCP/IP communication a little faster.
- 4) Specify `InclExcl` if you want TSM to include or exclude the files listed in `incl excl.list`. This is optional. You would usually exclude all database files that were processed by the SAP MaxDB database backup.
- 5) If you have tape drives with hardware compression attached to the TSM server, you might get better throughput with the hardware compression than you would with the TSM client software compression (`Compression OFF`).

---

## Chapter 3. Setting Up ADINT/TSM

ADINT/TSM must be installed on the systems used as SAP MaxDB database servers. The following steps must be followed to set up ADINT/TSM:

- 1) Make sure that the prerequisites are met, see “Prerequisites for the Installation of ADINT/TSM”, this page, below.
- 2) Get planning information, see “Installation Planning of ADINT/TSM”, this page, below.
- 3) Install ADINT/TSM, see “Installing ADINT/TSM”, next page.
- 4) Configure ADINT/TSM, see “Configuring ADINT/TSM”, page 27.
- 5) Integrate ADINT/TSM into the SAP MaxDB environment, see “Connecting ADINT/TSM with SAP MaxDB” on page 29.
- 6) Verify the installation, see “Verifying the Installation of ADINT/TSM” on page 29.

---

### 3.1 Prerequisites for the Installation of ADINT/TSM

For supported hardware and software and appropriate release levels required by the current version of ADINT/TSM, refer to the Release Notice on the ADINT/TSM WEB pages [http://www.ibm.com/de/entwicklung/adint\\_tsm/](http://www.ibm.com/de/entwicklung/adint_tsm/).

The following products must be installed before you can start setting up ADINT/TSM:

- SAP MaxDB
- SAP ERP or mySAP e-business solution, based on SAP MaxDB
- TSM server and TSM Backup/Archive and API client. The TSM API client must be installed on the local system, refer to “Chapter 2. TSM Setup” on page 16.  
TCP/IP must be ready for communication with the TSM server.

For information on the functions, product versions, and maintenance levels that are compatible with your version of SAP R/3 or mySAP.com, consult SAP support, for example via the Online Service System (OSS).

The appropriate modules can be downloaded from the SAP server. Information about this can be found in OSS note 19466.

---

### 3.2 Installation Planning of ADINT/TSM

When starting the installation procedure, be prepared to provide the following information:

- SAP MaxDB database SID
- For Windows only: Installation path for ADINT/TSM executables
- Path for ADINT/TSM configuration files.

During the installation, configuration files for ADINT/TSM (profile `initSID.utl` and configuration file `internparamfile.adi` will be saved to this path. Old configuration files should be renamed to `<filename>.nnn`, where `nnn` is a three-digit decimal number.

- For UNIX/Linux only: Owner and group for the ADINT/TSM configuration files.
- TSM server name and TSM node name (TSM node configured on the TSM server assigned to backup above SID. For details, refer to “Node Definition” on page 20
- TSM management classes for database, incremental and log backups. For details, refer to “Policy Definition” on page 19.

---

## 3.3 Installing ADINT/TSM

The ADINT/TSM program package (most current version) is usually downloaded from the following webpage:

[http://www.de.ibm.com/entwicklung/esd/ADINT\\_tsm/](http://www.de.ibm.com/entwicklung/esd/ADINT_tsm/)

where the 'Readme' and the 'Installation and User's Guide' can be obtained as well.

ADINT/TSM can also be ordered to be delivered as a package on CD-ROM. The file `README.1ST` in the root path includes information where to find the particular objects on the media.

**Note:** If you are going to upgrade from an earlier version of ADINT/TSM, you need to remove the old version before installing the new version. For more information on the deinstallation procedures, refer to “Uninstalling ADINT/TSM” on page 30.

A step by step example for setting up and configuring a complete backup/restore environment for SAP MaxDB using ADINT/TSM with TSM can be found in Appendix J: “Setup and Configuration Summary” on page 66.

### Installing ADINT/TSM on UNIX (AIX, HP-UX, Solaris) / Linux

ADINT/TSM for UNIX systems is delivered as an installation package named `install_adint_<version>_<operating system>.bin`

where

`<version>` is the ADINT/TSM version to be installed,

`<operating system>` is AIX, HP-UX, Solaris or Linux.

The ADINT/TSM installation includes the following steps:

- Read the Release Notice and the README file provided with ADINT/TSM .
- Log in as root user on the SAP database server. Make sure the DISPLAY variable is set correctly as the installation procedure requires a graphical X - Window.
- Start the installation program and follow the instructions of the installation dialog.
- Check the Pre-Installation summary at the end of the installation dialog, where you will find the installation path into which the ADINT/TSM executables will be installed (environment variable ADINT). The installation log (`log.txt`) will be located in this installation path, too.

Modifications made to your system during installation are determined by 2 environment variables, which are entered into the user .profile during installation:

- ADINT points to the installation path for ADINT/TSM  
(AIX: /usr/tivoli/tsm/adint64 , other: /opt/tivoli/tsm/adint64)  
which after installation will contain the following files:
  - README
  - RELNOTE, the current release notice
  - adint2 ADINT/TSM executable
  - adintagent ADINT/TSM executable
  - adint2.cat ADINT/TSM message catalog
  - log.txt installation log
  - internparamfile.adl template ADINT/TSM options file
  - initSID.utl sample ADINT/TSM profile
  - plus additional sample files
- ADA\_OPT points to the configuration path for configuration files, which should be different to the installation path. After the installation the following files will be placed in the configuration path:
  - internparamfile.adl options file used
  - init<SID>.utl work copy of profilewhere <SID> is the SAP MaxDB database SID as defined during installation

**Note:** The environment variables ADINT and ADA\_OPT are set for the user only if the UNIX shell used reads the .profile. If not, the variables must be set manually.

## Installing ADINT/TSM on Windows

ADINT/TSM for Windows is delivered as a single executable file named  
install\_adint\_<version>\_windows.exe

where

<version> is the ADINT/TSM version to be installed.

The ADINT/TSM installation requires the following steps:

- 1) Read the Release Notice and the README file provided with the ADINT/TSM package.
- 2) Log in as user with administrator authority on the SAP database server.
- 3) Invoke the executable mentioned above and follow the instructions of the installation dialog.
- 4) Check the Pre-Installation summary at the end of the installation dialog, where you will find the installation path into which the ADINT/TSM executables will be installed (environment variable ADINT). The installation log (log.txt) will be located in this installation path, too.

Modifications made to your system during installation are determined by 2 environment variables

- ADINT points to the installation directory (\tivoli\tsm\adint) for ADINT/TSM, which after installation will contain the following files:
  - README.txt
  - RELNOTE.txt, the current release notice
  - adint2.exe ADINT/TSM executable
  - adintagent.exe ADINT/TSM executable
  - log.txt installation log
  - internparamfile.adi template ADINT/TSM options file
  - initSID.utl sample ADINT/TSM profile
  - plus additional sample files
- ADA\_OPT points to the configuration directory (should be different to the installation directory), which after installation will contain these files:
  - internparamfile.adi
  - init<SID>.utlwhere <SID> is replaced by the database SID during installation

---

## 3.4 Configuring ADINT/TSM

After successful completion of the installation of ADINT/TSM, you need to

- 1) configure the TSM password for the TSM server and node specified during installation (see “Password Handling” below)
- 2) adapt the SAP MaxDB environment for use with ADINT/TSM (see “Connecting ADINT/TSM with SAP MaxDB” on page 29).

### Password Handling

Before you can start using ADINT/TSM, you need to define which password handling method you want to use. (For a discussion of the options, see “Appendix C. Password Handling” on page 49.) You can choose between *manual password handling* and *automatic password handling*.

If want to use *manual password handling*, you must provide the password which was specified when the node ID was initially registered with the TSM server (see “Node Definition” on page 20). The password is requested initially and again each time it expires for this node within TSM.

If you are using *automatic password handling*, you need to:

- update the password on the TSM server
- log on once using the above password function on the client node

When the password expires, a new password will be generated between client node and server automatically.

Depending on the password handling method you want to use, you have to define the settings as shown in table 2 on the TSM and on the ADINT/TSM side:

Settings in	Manual Password Handling	Automatic Password Handling
TSM client options file	PASSWORDACCESS prompt	PASSWORDACCESS generate
ADINT/TSM profile	PASSWORDREQUIRED yes NODENAME <node name>	PASSWORDREQUIRED yes # NODENAME <node name>

Table 2. Required Settings for Password Handling

Normally, you are prompted for the client password every time ADINT/TSM starts a TSM session. This can be avoided if the client password is stored in encrypted form in the ADINT/TSM configuration file (`internparamfile.adi`). This can be done with the following command:

```
adint2 -x
```

ADINT/TSM prompts for all required passwords that were set for the TSM server(s) defined in the ADINT/TSM profile and checks whether the passwords are valid. If a connection between ADINT/TSM and a TSM server is to be established, ADINT/TSM reads the password from the configuration file and uses it to register on the TSM server.

## Usage Key Handling

ADINT/TSM can be used without any usage key for 60 days after installation for test and evaluation purposes.

For unrestricted use (full function, no expiration) of purchased copies of ADINT/TSM the support hotline will provide a usage key to customers with an entitlement for maintenance, refer to the Release Notice (README) of a specific release.

The usage key can be installed with the following command:

```
adint2 -1
```

## Customizing the ADINT/TSM Profile

After successful completion of the installation procedure for ADINT/TSM, an initial setup must be performed in the profile by setting the parameters according to your needs.

A detailed description of all possible profile keywords can be found in "Appendix B. ADINT/TSM Profile", on page 44.

The profile is located in the path given by the variable `ADA_OPT`.

## Specifying another TSM Server

To add a new TSM server to your configuration, you need to perform the following steps:

- 1) Add a new server statement to your ADINT/TSM profile.
- 2) Set the ADINT/TSM password (see "Password Handling" on page 27).

---

## 3.5 Connecting ADINT/TSM with SAP MaxDB

To connect ADINT/TSM with the SAP MaxDB environment, two specific variables must be defined for each SAP MaxDB database to be backed up with ADINT/TSM:

- ADINT (specifies path/directory of the ADINT/TSM executables)
- ADA\_OPT (specifies path/directory and names of the ADINT/TSM profile and configuration file)

Note: In UNIX environments ADINT and ADA\_OPT need also be set for the SAP MaxDB environment (in addition to the user .profile).

You can configure the environment on a SAP MaxDB database server by issuing the following *Database Manager Client (DBMCLI)* command:

```
dbmcli -d <DB> -n <server> -u <user>,<pw> dbm_configset -raw  
  <keyword> <value>
```

where

<DB>	is the SID (name) of the database
<server>	is the name of the database server
<user>	is the name of the user with DBM operator authorization
<pw>	is the password of the user with DBM operator authorization
<keyword>	is the name of the variable to be specified
<value>	is the value for the variable to be set

The following example for a UNIX environment connects ADINT/TSM to database 'C21' on server 'dbserv1':

```
dbmcli -d C21 -n dbserv1 -u dbm,dbm dbm_configset -raw ADINT  
  /usr/tivoli/tsm/adint64  
dbmcli -d C21 -n dbserv1 -u dbm,dbm dbm_configset -raw ADA_OPT  
  /maxDB/adint/initC21.utl
```

In order to select a different set of ADINT/TSM environment settings, for example specifying another ADINT/TSM profile in ADA\_OPT, issue the appropriate DBMCLI command again as mentioned above.

---

## 3.6 Verifying the Installation of ADINT/TSM

In order to verify the installation of ADINT/TSM, start a complete database backup. Refer to Chapter 4. "Using ADINT/TSM with SAP MaxDB DBMCLI" on page 31 for further usage instructions and examples.

---

## 3.7 Upgrading ADINT/TSM

The following steps are needed to upgrade ADINT/TSM:

- Uninstall the old version. For the uninstallation procedure, see “Uninstalling ADINT/SM” on next page.
- Install the new version following the steps described in “Installing ADINT/TSM” on page 25.

---

## 3.8 Uninstalling ADINT/TSM

Uninstalling ADINT/TSM removes the software from the system. The ADINT/TSM configuration files are retained, however.

### Uninstalling ADINT/TSM from UNIX (AIX, HP-UX, Solaris)/Linux

1. Log in as root user.
2. Ensure that ADINT/TSM is not running.
3. Make sure that the DISPLAY variable is set correctly as the uninstallation procedure requires a graphical X-Window.
4. Invoke the executable `<installation path>/_uninst/uninstaller.bin` where `<installation path>` is  
AIX: `/usr/tivoli/tsm/adint` or `/usr/tivoli/tsm/adint64`  
other: `/opt/tivoli/tsm/adint` or `/opt/tivoli/tsm/adint64`

and follow the instructions of the uninstallation procedure.

### Uninstalling ADINT/TSM from Windows

- Log on as user with administrator authority.
- Ensure that ADINT/TSM is not running.
- Select **Start -> Settings -> Control** panel.
- Click **Add/Remove Programs**.
- Select **ADINT/TSM** and click **Remove**.

and follow the instructions of the uninstallation procedure.

---

## Chapter 4. Using ADINT/TSM with SAP MaxDB DBMCLI

The SAP MaxDB database management tool *Database Manager (DBM)* can be called via a graphical user interface (*DBMGUI*), via a Web-based interface (*WEBDBM*) or as a command line utility (*DBMCLI*).

This chapter gives an overview of how ADINT/TSM and the *DBMCLI* of SAP MaxDB can be used for backing up or restoring SAP MaxDB databases.

In addition to the standard backup and restore commands, the most important SAP MaxDB preparation steps will be explained. For further information concerning SAP MaxDB backup and recovery refer to the SAP MaxDB home page at <https://www.sdn.sap.com/irj/sdn/maxdb>.

### SAP MaxDB Database Manager CLI

The SAP MaxDB *DBM* is a utility that can manage (e.g. create, start/stop, backup, recover or monitor) local or remote SAP MaxDB database instances. The program is suitable for both interactive and batch operations. You need only one *DBM* for the administration of all SAP MaxDB databases on all supported operating systems in your entire system landscape.

The *DBMCLI* is the client program which enables you to connect to the *DBM* server and exchange data with it. Calling up *DBMCLI* is equivalent to opening a *DBM* server session.

A user request is directed to the *DBM* server using a *DBM* server command and the corresponding options. Once the commands have been processed, the *DBMCLI* session with the *DBM* server is closed.

---

## 4.1 Backing up SAP MaxDB with ADINT/TSM and DBMCLI

This section shows a sample procedure for backing up SAP MaxDB databases with ADINT/TSM. Necessary configuration steps will be described first (backup media) and finally typical backup examples will be given.

<p><b>Note:</b> ADINT/TSM supports all types of SAP MaxDB database instances (SAP MaxDB ERP, SAP MaxDB OLTP, SAP liveCache, SAP MaxDB Document Server, SAP MaxDB OLAP, SAP MaxDB E-Catalog).</p>
--

### Backup Media

If you want to perform a SAP MaxDB backup or recovery with ADINT/TSM, you must define at least one appropriate backup medium with the *DBM*. A backup medium is assigned to each backup you perform.

SAP MaxDB backup media include *files*, *tapes*, *autoloaders* and *pipes*. ADINT/TSM is solely using pipes as backup medium. Therefore, scenarios with this media type will be discussed only.

Backup media will be defined separately for each individual SAP MaxDB database. You can define single backup media or combine media to form a group of parallel backup media (parallel backup and restore).

ADINT/TSM backup media have a defined naming convention with SAP MaxDB version 7.4 and 7.5: they must start with the prefix *ADSM*. With SAP MaxDB 7.6 and higher there are no special naming conventions.

To create a SAP MaxDB backup medium, follow these steps:

1. Logon to *DBMCLI*

```
dbmcli -d <DB> -u <user>,<pw> -n <server> -uUTL
```

where

<DB> is the SID (name) of the database

<server> is the name of the database server

<user> is the name of the user with *DBM* operator authorization

<pw> is the password of the user with *DBM* operator authorization

2. Create backup media

SAP MaxDB version 7.4 and 7.5:

```
medium_put ADSM<media ID> <location> PIPE <bkp_type>
```

SAP MaxDB version 7.6 and higher::

```
medium_put <media ID> <location> PIPE <bkp_type> 0 8 NO NO \"\"  
TSM
```

where

<media ID> is the name of the backup medium

<location> name of the device/file with which it can be addressed  
through operating system functions

<bkp\_type> the type of backup for which the medium will be used;  
possible values are: DATA, PAGES, LOG

**Note:** Specify the absolute name of a pipe. Consider the following naming conventions for pipe names on Windows: `\\.\pipe\<pipe_name>`

The following two examples define (for SAP MaxDB 7.5 and 7.6 or higher) two backup media (3 pipes) for ADINT/TSM backup/restore: full backup (2 sessions within 1 media group) and Log backup (single session)

**for UNIX (with SAP MaxDB version 7.5):**

```
medium_put ADSM_log /tmp/pipe_log PIPE LOG  
medium_put ADSM_parallel\ADSM_data1 /tmp/pipe_data1 PIPE DATA  
medium_put ADSM_parallel\ADSM_data2 /tmp/pipe_data2 PIPE DATA
```

for Windows (with SAP MaxDB version 7.6 and higher):

```
medium_put LogData \\.\pipe\pipe_log PIPE LOG 0 8 NO NO \"\" TSM
medium_put ParallelData\data1 \\.\pipe\p01 PIPE DATA 0 8 NO
      NO \"\" TSM
medium_put ParallelData\data2 \\.\pipe\p02 PIPE DATA 0 8 NO
      NO \"\" TSM
```

## Performing a Backup

After appropriate backup media are created as outlined before, SAP MaxDB backups with ADINT/TSM can be started.

For the backup, the database has to be in one of the two operational states *online* or *admin* (see SAP MaxDB User Manual for further details).

The state can be set by the following *DBMCLI* command:

```
backup_start <media ID> [recovery|migration] <backup_type>
```

where

<media ID>	is the name of the backup medium
[recovery]	data backup without checkpoint (default)
[migration]	data backup with checkpoint (to migrate the database)
<backup_type>	the type of backup; possible values are: DATA (complete data backup), PAGES (incr. data backup), LOG (log backup)

**Note:** The backup options *recovery* and *migration* are only usable for database backups. For information about checkpoints, see SAP MaxDB User Manual.

The following example shows the commands for a database and a log backup with ADINT/TSM:

```
backup_start ADSM_data recovery DATA
backup_start ADSM_log LOG
```

---

## 4.2 Restoring SAP MaxDB with ADINT/TSM and DBMCLI

This section shows a sample procedure for restoring SAP MaxDB databases with ADINT/TSM. The restore and recovery procedure can be seen as a two phase process:

1. determine the best-suited backup to start your recovery from based on criteria like
  - how fast can the media be accessed, e.g. remote vaulting
  - how close is it to the desired recovery point, etc.

During backup SAP MaxDB generates a unique identifier for each TSM backup. ADINT/TSM stores this identifier together with the backup image in TSM so that both are unambiguously linked together.

This unique identifier, the *External Backup ID (EBID)*, has to be determined before a restore/recovery can be started.

2. start the actual restore/recovery process of the SAP MaxDB database  
This process is governed by the corresponding SAP MaxDB functions, which call ADINT/TSM to restore specific objects as required by the restoration process.

ADINT/TSM can also be used for cloning a database from a source to a different target system. That requires some special customizing steps for ADINT/STM as well as for the SAP MaxDB on the target side. Refer to “Appendix K: “Cloning a SAP MaxDB with ADINT/TSM” on page 69 for a more detailed description.

### Determine and Display External Backup ID

First you select the database to be restored by issuing the following *DBCLI* command:

```
backup_ext_ids_get ADSM [<DB>] [<server>]
```

where

<DB> is the SID (name) of the database  
<server> is the name of the database server

A list of the available *EBIDs* can be displayed with:

```
backup_ext_ids_list
```

The information returned includes availability status of the backup images, *EBID*, backup type and creation timestamp for each backup image.

## Performing a Restore/Recovery

To start the restore/recovery actions (based on an *EBID* selected above) the database has to be in the operational state *admin* (see SAP MaxDB User Manual for details):

```
recover_start <media ID> <backup_type> EBID <EBID>
```

where

<media ID>	is the name of the backup medium
<backup_type>	the type of backup to be restored, possible values are: DATA (complete data backup), PAGES (incremental data backup) LOG (log backup)
<EBID>	External Backup ID that is used to identify the backup to ADINT/TSM

If it is necessary to restore more than one Log backup object, the second and all subsequent log backup objects can be restored as follows:

```
recover_replace <media ID> EBID <EBID>
```

**Note:** To restore all Log backups belonging to a specific database backup image, use `recover_start` for the first Log object followed by `recover_replace` for all additional Log objects. For more information see the SAP MaxDB User Manual.



---

## Appendix A. ADINT/TSM Messages

This chapter describes how to find message files (log files) and explains the individual messages issued by ADINT/TSM.

---

### How To Find Message Files (Log Files)

ADINT/TSM progress and status messages are logged in a file with the default name `adint2.log`. The path for this file is defined by the profile keyword `LOGFILE` in the ADINT/TSM profile, see page 44.

Unless defined otherwise, `LOGFILE` points to the same path as specified for the ADINT/TSM configuration file during installation.

SAP MaxDB writes a backup protocol where detailed information about the complete backup or restore process with external backup tools, e.g. ADINT/TSM, will be written to. The name of the SAP MaxDB log file is **dbm.ebl**. You find this file in

`<SAP MaxDB installation path>/sdb/data/wrk/<SID>`, where `<SID>` is the name of the SAP MaxDB database.

---

### ADINT/TSM Message Explanations

The messages begin with the prefix `ADI` and are listed in numerical order.

For each message, the following information is provided:

- Message number
- Severity code
- Explanation and User Response

The following letters give an indication of the severity of the action that generated the message.

The severity codes and their meanings are as follows:

<b>E</b>	Error	Processing cannot continue.
<b>W</b>	Warning	Processing can continue, but problems may occur later.
<b>I</b>	Information	Processing continues. User response is not necessary.

---

**ADI0002I** ADINT has ended successful.  
Explanation: The ADINT/TSM process is done without any errors.  
User Response: None

---

**ADI0003E** ADINT has ended with an error.  
Explanation: An error occurred during the last command execution.  
User Response: Check the ADINT/TSM log for more detailed descriptions about it.

---

**ADI0004E** Every option should start with '-': >option<.  
Explanation: ADINT/TSM was unable to use the entered option.  
User Response: Ensure that every option begins with the character '-'.

---

**ADI0005E** The savename is not valid :>savename<.  
Explanation: ADINT/TSM was unable to handle the given savename.  
User Response: Ensure that the savename only comprises letters, numbers and the characters '.', or '\_'. Further, it is necessary that the savename comprises one of the following strings: 'SAVEDATA', 'SAVEDTCHK', 'SAVEPAGES', 'SAVEPGNCHK', 'SAVELOG' or 'SAVELOGSEG'.

---

**ADI0006E** There is more than one action in this command.  
Explanation: Many actions at the same time are not allowed.  
User Response: Ensure that you have specified only one action.

---

**ADI0007E** Option '-n' without savename/searchmask.  
Explanation: The option '-n' requires the specification of a savename/searchmask.  
User Response: Check your input and complete the option '-n' with a savename/searchmask.

---

**ADI0008E** Two savenames/searchmasks specified: >savename<,>savename<.  
Explanation: More than one savename/searchmask at once is not allowed.  
User Response: Delete one of the names and try it again.

---

**ADI0009E** Option '-p' without pipename.  
Explanation: The option '-p' requires the specification of a pipename.  
User Response: Check your input and complete the option '-p' with a pipename.

---

**ADI0018E** The pipename is missing.  
Explanation: The pipe, you want to read from / write to was not specified.  
User Response: Ensure that you have specified a pipename for any ADINT/TSM backup / restore action.

---

**ADI0019E** The savename/searchmask is missing.  
Explanation: Without specification of a savename or searchmask ADINT/TSM cannot do anything.

---

---

**ADI0010E** Option '-c' without blocksize.  
Explanation: The option '-c' requires the specification of a blocksize parameter.  
User Response: Check your input and complete the option '-c' with a blocksize parameter.

---

**ADI0011E** Option '-s' without estimated size.  
Explanation: The option '-s' requires the specification of an estimated size parameter.  
User Response: Check your input and complete the option '-s' with an estimated size parameter.

---

**ADI0012E** Option '-o' without logfilename.  
Explanation: The option '-o' requires the specification of a logfilename.  
User Response: Check your input and complete the option '-o' with a logfilename.

---

**ADI0013E** Unknown option :>option<.  
Explanation: The specified option is unknown.  
User Response: Try it again with one of the predefined options.

---

**ADI0015E** The TSM node name >nodename< has too much characters (max. 64 chars.).  
Explanation: The limitation of a nodename within TSM are 64 characters.  
User Response: Ensure that the number of characters of a nodename in the profile is less or equal than 64.

---

**ADI0016E** No TSM server entry specified in the profile.  
Explanation: It is necessary to have at least one TSM server entry in the profile.  
User Response: Ensure that there is an TSM server entry in the profile.

---

**ADI0017I** Nothing to do.  
Explanation: No command was specified..  
User Response: None.

---

**ADI0029E** Error while binding a communication socket.  
Explanation: The server socket cannot be bound.  
User Response: Check your setup. If the error still exists contact the ADINT/TSM support.

---

**ADI0030E** Error while sending a message to ADINTAGENT.  
Explanation: The ADINTAGENT is not running.

---

User Response: Check the input and add a savename or searchmask, if necessary.

---

ADI0020E The savename has wrong characters :>*savename*<.  
Explanation: See error message ADI0005E.  
User Response: See error message ADI0005E.

---

ADI0021E The savename >*savename*< has too much characters (max. 64 chars.).  
Explanation: The limitation of a savename are max. 64 characters.  
User Response: Ensure that the number of characters of a savename is less or equal than 64.

---

ADI0022E No valid TSM Server found doing the backup.  
Explanation: You have specified a TSM server in your profile which is not available.  
User Response: Check your TSM client options file (on UNIX the TSM client system options file) for a valid TSM server.

---

ADI0024E Communication with ADINTAGENT was broken.  
Explanation: The communication between ADINT and ADINTAGENT does not work. This occurs if your communication subsystem is not properly defined or has an error.  
User Response: Check your setup. If the error still exists contact the ADINT/TSM support.

---

ADI0025E The backup succeeded, but an error occurred while updating the ADINT version information.  
Explanation: ADINT/TSM was not able to update the backup version information in the config file after a backup completed.  
User Response: Check path and authorization of the ADINT/TSM config file. If the problem still exists contact the ADINT/TSM support.

---

ADI0026E The ADINTAGENT was not found or it was not accessible.  
Explanation: ADINT cannot find or execute the ADINTAGENT for processing.  
User Response: Check path and authorization of the ADINTAGENT.

---

ADI0027E ADINT cannot create a new process.  
Explanation: ADINT cannot start the ADINTAGENT.  
User Response: Try it again. If the problem still exists check the ADINT/TSM log for further error descriptions.

---

ADI0028E Error while creating a communication socket.  
Explanation: The server socket cannot be created.  
User Response: Check your setup. If the error still exists contact the ADINT/TSM support.

---

User Response: Check your setup. If the error still exists contact the ADINT/TSM support.

---

ADI0031E Cannot get communication parameters.  
Explanation: The local name of the server socket cannot be retrieved.  
User Response: Check your setup. If the error still exists contact the ADINT/TSM support.

---

ADI0032E Communication error with ADINTAGENT.  
Explanation: See error message ADI0024E.  
User Response: See error message ADI0024E.

---

ADI0033E Found a >...< statement in profile without a TSM server statement before in line *linenumber*.  
Explanation: The TSM server specification is necessary in the profile.  
User Response: Insert the name of a TSM server in the profile.

---

ADI0034I No ADINT backup images found on server >*server*<.  
Explanation: ADINT/TSM has not found an backup image on the specified TSM server.  
User Response: None.

---

ADI0035I Syntax error in profile line *linenumber*.  
Explanation: Either a syntax error or an unknown entry in the profile was found.  
User Response: Check your profile.

---

ADI0037E Environment variable 'ADA\_OPT' is not set.  
Explanation: The environment variable ADA\_OPT, containing the full qualified path of the ADINT/TSM profile, is missing.  
User Response: Set environment variable ADA\_OPT.

---

ADI0039E Environment variable 'ADINT' is not set.  
Explanation: The environment variable ADINT, containing the path where the ADINT/TSM executables reside, is missing.  
User Response: Set the environment variable ADINT.

---

ADI0041E The searchmask >*searchmask*< has wrong characters.  
Explanation: See error message ADI0005E.  
User Response: See error message ADI0005E.

---

---

**ADI0042E** The searchmask *>searchmask<* has too much characters (max. 64 chars.).  
Explanation: The limitation of a searchmask are max. 64 characters.  
User Response: Ensure that the number of characters of a searchmask is less or equal than 64.

---

**ADI0043I** Using searchmask *"\*"*.  
Explanation: You have not specified a searchmask to query a TSM server. The metacharacter *"\*"* will be used instead.  
User Response: None.

---

**ADI0044E** Error while checking the profile *>filename<*.  
Explanation: One or more entries in the profile are wrong or one or more necessary entries in the profile are missing.  
User Response: Check the entries of your profile.

---

**ADI0045E** Unexpected end of line in line *linenumber*.  
Explanation: A keyword without a value in the profile is not allowed.  
User Response: Complete these keywords with a appropriate value or remove them from the profile.

---

**ADI0047E** Syntax error in line *linenumber* with content *>text<*.  
Explanation: Only characters, numbers and the special characters *'* and *'* are allowed.  
User Response: Check the entries of your profile.

---

**ADI0049E** Error while opening the profile *>profile<*.  
Explanation: ADINT/TSM cannot find or open the profile.  
User Response: Ensure that the path and authorization of your profile are set correctly and that the settings of the ADA\_OPT environment variable corresponds with the location and the name of your profile.

---

**ADI0050E** Error while creating a new process.  
Explanation: See error message ADI0027E.  
User Response: See error message ADI0027E.

---

**ADI0051E** Error while opening pipe *>pipename<*.  
Explanation: ADINT/TSM cannot find or open the specified pipe.  
User Response: Ensure that the path, authorization and name of the pipe are set/defined correctly.

---

**ADI0052E** TSM API Error: *error*.  
Explanation: During a connection of ADINT/TSM to TSM server, a TSM error occurred.  
User Response: Use the TSM Messages guide and correct the TSM error. Try your last action again.

---

**ADI0053E** Unknown TSM API Error with rc = *errornumber*.  
Explanation: See error message ADI0052E.  
User Response: See error message ADI0052E.

---

---

**ADI0055I** No ADINT logfile given so using *>logfile<*.  
Explanation: There is no logfile specified in the profile. Therefore, the name will be generated by ADINT/TSM and stored in the path pointed to by ADA\_OPT.  
User Response: None.

---

**ADI0056E** Cannot open ADINT logfile *>logfile<*.  
Explanation: ADINT/TSM cannot find or open the log file.  
User Response: Ensure that the path and authorization of your log file are set correctly.

---

**ADI0057I** Canceling all sessions.  
Explanation: All sessions (agents) will be stopped after an error occurred.  
User Response: Check your setup. If the error still exists contact the ADINT/TSM support.

---

**ADI0058I** Received an 'COMMIT' message from SAP MaxDB.  
Explanation: The backup was successful.  
User Response: None.

---

**ADI0059E** Received an 'ABORT' message from SAP MaxDB: *>message<*.  
Explanation: SAP MaxDB has sent a ABORT message to ADINT/TSM. It indicates that there was a problem in SAP MaxDB during the backup.  
User Response: Check the SAP MaxDB backup logs.

---

**ADI0060E** The backup succeeded, but an error occurred deleting old backup versions.  
Explanation: See error message ADI0025E.  
User Response: See error message ADI0025E.

---

**ADI0061E** While querying the TSM server *>server<* an error occurred with TSM API message:  
Explanation: See error message ADI0052E.  
User Response: See error message ADI0052E.

---

**ADI0065I** The TSM server *>server<* is not available:  
Explanation: See error message ADI0052E.  
User Response: See error message ADI0052E.

---

**ADI0067I** Setting estimated size to *size*.  
Explanation: The default estimated size will be used.  
User Response: It is possible to use the command option *-s size* to specify an other value for this parameter.

---

**ADI0068I** Setting transfer blocksize to *size*.  
Explanation: The default transfer blocksize will be used.  
User Response: It is possible to use the command option *-c size* to specify an other value for this parameter.

---

---

**ADI0054E** Cannot open the config file >config file<.  
Explanation: ADINT/TSM cannot find or open the config file.  
User Response: Ensure that the path and authorization of your config file are set correctly and that the ADA\_OPT environment variable is set.

---

---

**ADI0070I** Delete >savename< with version *number* session *number* of *number* sessions.  
Explanation: A backup image was deleted from TSM server.  
User Response: None.

---

---

**ADI0071I** Nothing to delete on Tivoli Storage Manager server >server<.  
Explanation: The specified Tivoli Storage Manager server contains no ADINT/TSM backup images.  
User Response: None.

---

---

**ADI0080I** *number* Bytes were restored in *number* seconds; this is an average restore speed of *number* MB/s or *number* GB/h.  
Explanation: Shows the average throughput of the last successful restore.  
User Response: None.

---

---

**ADI0072E** The Tivoli Storage Manager server >server< is not responding.  
Explanation: Either you have specified a connection to a Tivoli Storage Manager server in your profile which is not available or the Tivoli Storage Manager server is down and cannot be accessed.  
User Response: Check the servername and ensure the server is available. Try it again.

---

---

**ADI0081I** *number* were backed up in less than one second.  
Explanation: Shows the average throughput of the last successful backup.  
User Response: None.

---

---

**ADI0073I** The current version is *number*.  
Explanation: Shows the version number of the last successful backup.  
User Response: None.

---

---

**ADI0082I** *number* were restored in less than one second.  
Explanation: Shows the average throughput of the last successful restore.  
User Response: None.

---

---

**ADI0074E** The savename was used before, choose a unique name.  
Explanation: A savename must be unique on a Tivoli Storage Manager server for the specified node.  
User Response: Choose another name and try it again.

---

---

**ADI0083I** Not enough available sessions so increasing >server< to *number* session(s).  
Explanation: The session entries in the profile are less than the actually specified session number for a backup.  
User Response: It is recommended to adjust the session entries in the profile.

---

---

**ADI0075E** The savename to be restored was not found.  
Explanation: The savename you have specified was not found on the Tivoli Storage Manager server.  
User Response: Use the ADINT/TSM query command option 'q' to obtain a list of available savenames.

---

---

**ADI0084E** The ADINTAGENT has an invalid version number. The version number is *number* and should be *number*.  
Explanation: ADINT and ADINTAGENT are of incompatible versions.  
User Response: Check your setup. If the error still exists contact the ADINT/TSM support.

---

---

**ADI0076E** Only *number* of *number* sessions available.  
Explanation: Not all sessions needed for a parallel restore are available.  
User Response: Check your setup. If the error still exists contact the ADINT/TSM support.

---

---

**ADI0085E** An error occurred while writing to the pipe.  
Explanation: ADINT/TSM was not able writing to the pipe.  
User Response: Check the settings of the pipe defined within SAP MaxDB. Ensure that the path and authorization for the pipe are set correctly. Try the last action again.

---

---

**ADI0077E** The backup was done with *number* sessions. The restore was issued with *number* sessions instead.  
Explanation: It is necessary that the number of backup sessions are equal to the number of restore sessions.  
User Response: Check the number of sessions of your backup to be restored (use the ADINT/TSM query command option 'q'). For the restore action ensure that

---

---

**ADI0087E** The ADINTAGENT with id *id* has an error while >message< with error code *number* from OS.  
Explanation: The ADINTAGENT 'id' has stopped the work process because an error occurred, e.g. it could not find the pipe which was specified.  
User Response: Try to solve the problem and start the action again. If the problem still exists contact the ADINT/TSM support.

---

you use exactly the same number of sessions as you specified for the backup.

---

**ADI0078E** ADINT received a signal *signal*.  
Explanation: The operating system has sent a signal, e.g. *SIGINT* or *SIGKILL*.  
User Response: ADINT/TSM was stopped, therefore restart the last action. If the problem still exists, contact the ADINT/TSM support.

---

**ADI0079I** *number* Bytes were backed up in *number* seconds; this is an average backup speed of *number* MB/s or *number* GB/h.  
Explanation: Shows the average throughput of the last successful backup.  
User Response: None.

---

**ADI0092I** The license is valid until *>date<*.  
Explanation: Shows how long the test/evaluation version of ADINT/TSM can be used.  
User Response: None.

---

**ADI0093E** The license key *>license<* has too few characters.  
Explanation: The license key must consist of 9 characters.  
User Response: Check the license key and try again.

---

**ADI0094I** Sorry, but the evaluation time for ADINT/TSM is over. For getting a licensed version contact the ADINT/TSM support.  
Explanation: ADINT/TSM needs a new evaluation key or a full license key.  
User Response: Contact the ADINT/TSM support.

---

**ADI0095E** The license key *>license<* has wrong characters.  
Explanation: Only numbers and letters are allowed for the license key.  
User Response: Check the license key and try again.

---

**ADI0096I** The license key check procedure succeeded.  
Explanation: The license key you entered was successfully verified.  
User Response: None.

---

**ADI0097E** The license key *>license<* is wrong for this ADINT version.  
Explanation: The license key you entered was wrong.  
User Response: Check the license key and try again. If the problem still exists, contact the ADINT/TSM support.

---

**ADI0088E** An error occurred while starting the 'winsock.dll'.  
Explanation: This error occurs only on Windows systems. It indicates that there is a problem initializing the Windows socket functions.  
User Response: Check your setup. If the error still exists contact the ADINT/TSM support.

---

**ADI0090E** The ADINTAGENT could not connect to ADINT, rc = *number*.  
Explanation: A problem within the socket connection between ADINT and ADINTAGENT occurred.  
User Response: Check your setup. If the error still exists contact the ADINT/TSM support.

---

**ADI0169E** Semantic error in line *>line number<*. Check the keyword value.  
Explanation: The ADINT/TSM profile contains a keyword with a wrong parameter.  
User Response: Check the ADINT/TSM profile entry (parameter range). Try it again.

---

**ADI0170W** WARNING! You are not entitled to hotline *>date<*.  
Explanation: The support contract has expired. In case of any problems, you are not entitled to any support from IBM.  
User Response: Contact ADINT support to discuss extension / renewal of your support contract.

---

**ADI0171W** Support contract will expire on *>date<*.  
Explanation: The support contract will expire on the given date. From then on, you are not entitled to any support from IBM.  
User Response: Contact ADINT support to discuss extension / renewal of your support contract.

---

**ADI0172I** Creating *>number<* logcopies  
Explanation: Multiple logcopies will be backed up to TSM.  
User Response: None.

---

**ADI0173I** Restoring logcopy *>number<*  
Explanation: Multiple logcopies were backed up to TSM. Currently, logcopy *number* is being restored.  
User Response: None.

---

**ADI0174E** Restore of logcopy *>number<* failed  
Explanation: Multiple logcopies were backed up to TSM. The restore of logcopy *number* has failed.  
User Response: None. ADINT will switch automatically to another copy.

---

**ADI0098I** A licensed ADINT version is already installed.  
Explanation: If a full ADINT/TSM version is already installed, no further license key input is necessary.  
User Response: None.

---

**ADI0099E** No archive copy group for management class *>management class<* was defined.  
Explanation: ADINT/TSM needs only Tivoli Storage Manager management classes with defined archive copy groups.  
User Response: Check if the management classes specified in the profile have defined archive copy groups.

---

**ADI0168E** The ADINTAGENT has an invalid build number. The build number is *>number<* and should be *>number<*.  
Explanation: The executables ADINT and ADINTAGENT are of different build numbers or of different versions.  
User Response: Check the installed ADINT version. If the problem still exists contact the ADINT/TSM support.

---

**ADI0175E** Multiple logcopies are only available with productive version. Please contact ADINT support to receive a usage key.  
Explanation: A backup with multiple logcopies was tried with the ADINT test version. This feature is enabled only in the productive ADINT version.  
User Response: Contact ADINT support to receive a usage key.

---

**ADI0176E** You specified logcopies *>number<*, but no secondary management class or secondary server was provided.  
Explanation: A backup with multiple logcopies was tried but no secondary management class / secondary server was provided.  
User Response: Provide a secondary log management class or a secondary server in the ADINT profile.

---

---

**ADI0177E** Multiple sessions / multiple servers are only available with productive version.  
Explanation: A backup with multiple sessions / multiple servers was tried with the ADINT test version. This feature is enabled only in the productive ADINT version.  
User Response: Contact ADINT support to receive a usage key.

---

**ADI0201I** Enter the license key (9 characters):  
Explanation: ADINT/TSM prompts for a license key to be installed. The first 9 characters will be verified.  
User Response: None.

---

**ADI0204I** Enter password for node *>node<* on server *>server<*:  
Explanation: ADINT/TSM prompts for a password to be installed.  
User Response: None.

---

**ADI0205E** No NODENAME specified in profile for server *>server<*.  
Explanation: If a ADINT/TSM password will be installed, every Tivoli Storage Manager server entry in the profile needs a corresponding nodename entry.  
User Response: Check if the server entries in the ADINT/TSM profile have a corresponding nodename entry assigned.

---

**ADI0206I** The password check procedure succeeded.  
Explanation: The password you entered was successfully verified.  
User Response: None.

---

**ADI0207E** The password is wrong for node *>node<* on server *>server<* or the TSM server is not responding.  
Explanation: The password verification failed or a connection to a Tivoli Storage Manager server specified in the profile could not be established for verifying the password.  
User Response: Check the password and ensure all Tivoli Storage Manager server specified in the ADINT/TSM profile are available. Try it again.

---

---

## Appendix B. ADINT/TSM Profile

This section describes the ADINT/TSM profile, which is used to customize the way ADINT/TSM operates. ADINT/TSM reads the profile everytime it is called before it starts an operation..

The following rules apply to the syntax:

- Each line is analyzed separately.
- Keywords can start in any column of the line.
- Keywords must not be preceded by any string, except blanks.
- If a keyword is encountered several times, the last one is used.
- File processing stops at the end of the file.
- The comment symbol is #. Scanning of the current line stops when the comment symbol is encountered. No comment is allowed between the keyword and the value(s).

For example:

```
#FULLMANAGEMENTCLASS      MLOG1 <-- correct
FULLMANAGEMENTCLASS        MLOG1 # <-- correct
FULLMANAGEMENTCLASS        # MLOG1 <-- WRONG
```

Below overview of the profile parameters is followed by a sample profile `initSID.utl`, which is also included in the installation package.

---

### Keyword Reference

Only a few keywords are mandatory, most are optional. Each optional keyword has a preset default value, which is given after the '|' symbol.

**BUFFERSIZE** *buffersize* | 131072

This parameter is used to specify the *size* (Byte) of the data transfer buffers. If the value of the *buffersize* is greater than *zero*, then the data will be transferred via multiple *threads*.

If not specified, the default value is 131072 (128 KB) for UNIX or Linux systems and 32768 (32 KB) for Windows systems. In most cases, these values are appropriate. The valid range is from 4096 to 1048576.

**FULLMANAGEMENTCLASS** *mgmtclassname*

Specifies the TSM management class ADINT/TSM uses to backup the SAP MaxDB database with checkpoint (migration). The parameter string can consist of up to 30 characters.

<p><b>Note:</b> This parameter must be defined in conjunction with the corresponding <code>SERVER</code> statement, as shown in the sample profile.</p>
---

**FULLSESSIONS** *sessionnumber* | 1

The parameter *sessionnumber* shows how many *full* sessions (SAP MaxDB database backup) will be opened by the specified server. A negative session parameter results in an exclusion of the appropriate server from a backup action.

The valid range is from 1 to 64.

**Note:** This parameter must be defined in conjunction with the respective SERVER statement, as shown in the sample profile.

**Note:** This parameter is enabled in the productive ADINT version only (usage key)

**LOGFILE** *logfile*

Specifies the log file ADINT/TSM uses to store all log and trace information. The parameter must consist of path and log file name.

**LOGMANAGEMENTCLASS** *mgmtclassname*

Specifies the TSM management class ADINT/TSM uses to backup the SAP MaxDB log space. The parameter string can consist of up to 30 characters.

**Note:** This parameter must be defined in conjunction with the corresponding SERVER statement, as shown in the sample profile.

**LOGSESSIONS** *sessionnumber* | 1

The parameter *sessionnumber* shows how many *log* sessions (backup of the SAP MaxDB log space) will be opened by the specified server. A negative session parameter results in an exclusion of the appropriate server from a backup action.

Currently only one session can be used for log backups.

**Note:** This parameter must be defined in conjunction with the corresponding SERVER statement, as shown in the sample profile.

**MAX\_VERSION** *maxversionnumber* | 0

The parameter *maxversionnumber* defines the maximum number of backup generations to be kept in TSM server backup repository. The default setting for this value is 0, meaning that versioning is disabled.

The valid range is from 0 to 32768.

**NODENAME** *nodename*

If specified, *nodename* must be registered to the TSM server as a TSM node. With this option you can assign a different node name to your database system. It should be used if you have several SAP MaxDB database systems in your network with the same name, for example, <SID>, and they all use the same TSM server.

**Note:** This parameter must be defined in conjunction with the corresponding SERVER statement, as shown in the sample profile.

**PASSWORDREQUIRED** Y/N / YES

Specifies if TSM requires a password to be supplied by the TSM client. This depends on the TSM installation. For more information see the TSM administrator's manuals. If not specified the default is PASSWORDREQUIRED YES.

**Note:** This parameter must be defined in conjunction with the respective SERVER statement, as shown in the sample profile.

**REDOLOGCOPIES** n | 1

Specifies how many Log copies should be created by ADINT. If set to 2, ADINT will duplicate the logs received by SAP MaxDB.

Currently n can be set to either 1 or 2.

**Note:** This parameter is enabled in the productive ADINT version only (usage key)

**SERVER** *servername*

Denotes the name of the TSM server to which a path with the subsequent definitions will be established. All definitions following a 'SERVER' statement apply to this server until the next server statement.

For alternate paths, each path must have its own (logical) server name, even if they refer to one and the same real server (same TCP/IP address for all server names). For alternate servers, there must be different TCP/IP addresses for each of the different (real) TSM servers.

**Note:** Multiple/alternate Paths/Servers is enabled in the productive ADINT version only (usage key)

**TRACE** *tracelevel* | 0

If TRACE is specified, ADINT/TSM writes tracing information to the file specified with the parameter LOGFILE. The default setting for this value is 0, meaning that tracing is disabled. The valid range is from 0 to 200.

**Note:** Do not set a value greater than '15' for this parameter unless asked for by ADINT/TSM support. Values greater than '15' can degrade the performance of ADINT/TSM.

**UPDATEMANAGEMENTCLASS** *mgmtclassname*

Specifies the TSM management class ADINT/TSM uses for incremental SAP MaxDB database backups with checkpoint (migration). The parameter string can consist of up to 30 characters.

**Note:** This parameter must be defined in conjunction with the corresponding SERVER statement, as shown in the sample profile.

## UPDATESESSIONS *sessionnumber* /1

The parameter *sessionnumber* defines how many parallel sessions will be opened for an incremental backup. A negative session parameter results in an exclusion of the appropriate server from a backup action. The valid range is from 1 to 64.

**Note:** This parameter must be defined in conjunction with the corresponding SERVER statement, as shown in the sample profile.

**Note:** This parameter is enabled in the productive ADINT version only (usage key)

---

## Sample ADINT/TSM Profile

This sample profile (*initSID.utl*) is included in the ADINT/TSM installation package. The UNIX and Windows versions are nearly identical except for small differences due to naming conventions and the default value for *BUFFERSIZE*.

```
#-----
#       IBM ADINT/TSM interface for SAP MaxDB and Tivoli Storage Manager
#
#                               Sample Profile for ADINT/TSM
#-----

#-----
# Range: 0-32768
# A value of '0' means all versions will be kept.
#-----
MAX_VERSION                3

#-----
# Range: 0-200
# '15' is a good default for daily work. Increase only if instructed by
# support.
#-----
TRACE                      15

#-----
# This is where the ADINT/TSM logfile will be written to. Also a user
# defined name for the ADINT/TSM logfile can be specified.
#-----
LOGFILE                    /<path>/<filename>
```

```

#-----
# Range: 0-1048576
# Specifies the size (Byte) of the data transfer buffer for ADINT/TSM
# and TSM API.
#-----
BUFFERSIZE                131072

#-----
# Range: 1-2
# Specifies the number of redolog copies created by ADINT/TSM
#-----
REDOLOGCOPIES 1

#-----
# Statement(s) for TSM server(s) to be used. At least one server section has
# to be customized properly.
#-----
SERVER                    <server_a>      # TSM servername (max. 64 chars.)
  NODENAME                <node_a>        # TSM nodename (max. 64 chars.)
  PASSWORDREQUIRED        yes              # use a TSM password
  FULLSESSIONS            4                # TSM sessions (full backup)
  UPDATESESSIONS          2                # TSM sessions (incr. backup)
  LOGSESSIONS             1                # TSM sessions (log backup)
  FULLMANAGEMENTCLASS     <mgmtclass_a>    # TSM mgmtclass (full backup)
  UPDATEMANAGEMENTCLASS   <mgmtclass_b>    # TSM mgmtclass (incr. backup)
  LOGMANAGEMENTCLASS      <mgmtclass_c>    # TSM mgmtclass (log backup)

#SERVER                   <server_b>      # TSM servername (max. 64 chars.)
# NODENAME                <node_b>        # TSM nodename (max. 64 chars.)
# PASSWORDREQUIRED        yes              # use a TSM password
# FULLSESSIONS            4                # TSM sessions (full backup)
# UPDATESESSIONS          2                # TSM sessions (incr. backup)
# LOGSESSIONS             1                # TSM sessions (log backup)
# FULLMANAGEMENTCLASS     <mgmtclass_d>    # TSM mgmtclass (full backup)
# UPDATEMANAGEMENTCLASS   <mgmtclass_e>    # TSM mgmtclass (incr. backup)
# LOGMANAGEMENTCLASS      <mgmtclass_f>    # TSM mgmtclass (log backup)
#-----
# End of profile

```

## Appendix C. Password Handling

Consider the following alternatives with their implications:

### No password required by TSM (AUTHENTICATION OFF)

This is the simplest method; however, no security can be enforced. Every user connected to this server (authentication is set OFF on the TSM server level) can access TSM without a password. This method should only be used if adequate security alternatives can be established. If, for example, TSM is only used for SAP ERP (no other clients are registered) the access authorizations could be set in the UNIX system.

### Manual password generation

This method is simple to set up and provides password security, however, it requires a synchronized update of the password in TSM (client) and ADINT/TSM (command line). This method is only recommended during installation and testing together with a sufficiently long expiration period (to avoid having to change the password).

It is not recommended for production operation.

### Password set by TSM

In this case you do not have to synchronize the passwords manually on the TSM server and client sides. The generation and synchronization of passwords is handled by a TSM program. TSM sets the password automatically on a per-node basis according to the expiration specification.

This is the recommended method for an automated production environment.

After you have selected the suitable password handling alternative, follow the steps of the configuration matrix below to set the keywords/parameters in the different profiles accordingly.

Step	Profile/Action	Parameter	Password No	Password Manual	Password Set by TSM
1	TSM admin	AUTHENTICATION EXPIRATION PERIOD (see note 1)	OFF n.a.	ON <n days> (see note 2)	ON <n days>
2	for UNIX: dsm.sys for WINDOWS: <server>.opt	PASSWORDACCESS PASSWORDDIR (see note 5) NODENAME	n.a. n.a. n.a.	PROMPT n.a. n.a.	GENERATE <path> <nodename>
3	TSM client (UNIX only: root user)	SET PASSWORD	n.a.	<password> (see note 3)	n.a.
4	ADINT/TSM profile (init<SID>.utl)	For each SERVER statement specify: PASSWORDREQUIRED NODENAME	NO <nodename>	YES <nodename>	NO (see note 4)
5	ADINT/TSM command line	For each SERVER statement specify: adint2 -x See "Password Handling" on page 27.	n.a.	<password> (see note 1)	<password>

Table3. Password Handling Settings for UNIX or Windows

**Notes** (for table 3):

- 1) See TSM documentation
- 2) If you are using manual password generation during testing, make sure that the expiration period is set to a sufficiently long time (> 60 days).
- 3) For an initial setup, this password must be the same as was specified when registering the node to TSM. The password must be changed first on the TSM server and afterwards in ADINT/TSM.
- 4) NODENAME must not be set when PASSWORDACCESS generate is set.
- 5) The users <SID>adm and sqd<SID> must have read and write permission for the path specified.

---

## Appendix D. Alternate/Parallel Paths and Servers

With ADINT/TSM we use the term “path” to denote a connection between a TSM client, or better TSM “node”, and a TSM server.

ADINT/TSM provides the capability for controlling multiple communication paths and TSM servers in order to use several connections between SAP Max DB and TSM server(s) for the following two purposes:

- increase throughput of data transfer
  - over multiple paths simultaneously
  - to and from several servers in parallel
- increase the availability of the TSM client-to-server communication

In the profile `init<SID>.utl`, each path is defined by a `server` statement.

On UNIX, it is possible to store the corresponding definitions (communication parameters, e.g. `TCPSERVERADDRESS` and `TCPPORT`) in a single client system option file that is called `dsm.sys`.

On Windows, you will need to store the corresponding definitions for each logical server in separate client option files that have the file names `<server>.opt`. For example, if you have two logical TSM servers *fast* and *slow*, then you need two client option files `fast.opt` and `slow.opt`. Further, for Windows you need an additional client option file `dsm.opt`, which must be an empty file pointed to by `DSMI_CONFIG`. All Windows client option files must reside in the same directory.

The statement `SERVER <server 1..n>` denotes TSM servers in the ADINT/TSM profile. This corresponds to the statement `SERVERNAME <server 1..n>` in the TSM client option file(s). These servers are identified by their `TCPSERVERADDRESS` and can be located on one system (multiple paths) or several systems (multiple servers).

`FULLSESSIONS` and `UPDATESESSIONS` denotes the number of parallel sessions ADINT/TSM will schedule for the given path.

ADINT/TSM attempts to communicate with the TSM server using the first path in the profile. If this proves successful, ADINT/TSM starts the number of parallel sessions as specified for this path; if the attempt was unsuccessful, this path is skipped, and ADINT/TSM continues with the next path.

---

### Parameter Settings - SERVER Statement

The `SERVER` statement is part of the ADINT/TSM profile, and there are corresponding keywords in the TSM client option file.

(Depending on the choice of password handling, some parameters are ignored.)

The connection of the sections in the ADINT/TSM profile and the TSM client option file is established from the logical server name, which is defined in the keywords `SERVER` or `SERVERNAME`.

Configuration possibilities	ADINT/TSM profile init<SID>.uti	TSM client option file dsm.sys or <server>.opt <sup>[2]</sup>
single path; no password or manual password	SERVER <server> NODENAME <node> <sup>[1]</sup>	SERVERNAME <server> TCPSEVERADDRESS <address> NODENAME needs not be specified <sup>[1]</sup>
single path; automatic password by TSM	SERVER <server> NODENAME needs not be specified <sup>[1]</sup>	SERVERNAME <server> TCPSEVERADDRESS <address> NODENAME <node>
several paths/servers; no password or manual password	SERVER <server 1> NODENAME <node 1> . . . SERVER <server n> NODENAME <node n>	SERVERNAME <server 1> TCPSEVERADDRESS <address 1> NODENAME needs not be specified <sup>[1]</sup> . . SERVERNAME <server n> TCPSEVERADDRESS <address n> NODENAME needs not be specified <sup>[1]</sup>
several paths/servers; automatic password by TSM <sup>[3]</sup>	SERVER <server 1> NODENAME needs not be specified . SERVER <server n> NODENAME needs not be specified <sup>[1]</sup>	SERVERNAME <server 1> TCPSEVERADDRESS <address 1> NODENAME <node 1> . SERVERNAME <server n> TCPSEVERADDRESS <address n> NODENAME <node n>

Table 4. SERVER statement and appropriate profile and option file settings

**Notes:**

- [1] If NODENAME in the ADINT/TSM profile is not specified, the host name is used.
- [2] On UNIX, dsm.sys is the single client option file for all TSM servers. On Windows, there is a separate client option file <server>.opt for each TSM server.
- [3] If two different physical machines have the same TSM node name or if multiple paths are defined on one node using several server stanzas, PASSWORDACCESS generate may only work for the first stanza that is used after password expiration. During the first client-server contact, the user is prompted for the same password for each server stanza separately, and a copy of the password is stored for each stanza. When the password expires, a new password is generated for the stanza that connects the first client-server contact. All subsequent attempts to connect via other server stanzas will fail, because there is no logical link between their copies of the old password and the updated copy generated by the first stanza used after password expiration. To avoid this problem, update the passwords before they expire, to solve the problem if the passwords have expired, proceed as follows:
  1. dsmadm and update the password on the TSM server.
  2. Run dsmdc -servername=stanza1 and use the new password to generate a proper entry.
  3. Run dsmdc -servername=stanza2 and use the new password to generate a proper entry.

## Example 1: Increased Availability

Assume the following configuration:

- one TSM server
  - two tape drives installed
  - two LAN connections
    - 2Gb Ethernet (TCP/IP address yyy.yyy.yyy.yyy)
    - 1Gb Ethernet (TCP/IP address xxx.xxx.xxx.xxx)
- one SAP MaxDB database server connected to a 2Gb and a 1Gb Ethernet.

A full database backup is normally performed using the 2Gb Ethernet LAN (SERVER server\_a). If the 2Gb Ethernet is down, the backup should be performed using the 1Gb Ethernet connection (SERVER server\_b), although data transfer will take longer.

The definitions in the ADINT/TSM profile could be as shown in the example below.

```
SERVER                server_a      # 2Gb Ethernet (path 1)
NODENAME              C21
PASSWORDREQUIRED     yes
FULLSESSIONS         2
UPDATESESSIONS       2
LOGSESSIONS          1
FULLMANAGEMENTCLASS  mgmtclass_a
UPDATEMANAGEMENTCLASS mgmtclass_b
LOGMANAGEMENTCLASS   mgmtclass_c

SERVER                server_b      # 1Gb Ethernet (path 2)
NODENAME              C21
PASSWORDREQUIRED     yes
FULLSESSIONS         2
UPDATESESSIONS       2
LOGSESSIONS          1
FULLMANAGEMENTCLASS  mgmtclass_d
UPDATEMANAGEMENTCLASS mgmtclass_e
LOGMANAGEMENTCLASS   mgmtclass_f
```

If path 1 is *active*, ADINT/TSM will start the 2 sessions as defined in SERVER statement server\_a.

If path 1 is *inactive*, ADINT/TSM will start 2 sessions as defined in SERVER statement server\_b.

## Example 2: Increased Performance

Assume the following configuration:

- two TSM servers with connections to two FDDI networks
  - server\_a, TCP/IP address xxx.xxx.xxx.xxx
  - server\_b, TCP/IP address yyy.yyy.yyy.yyy
- each of these TSM servers has two tape drives installed
- one SAP MaxDB database server connected to two FDDI networks.

Full database backups are done on both systems every day, whereby the database backups will be started with 4 sessions.

The definitions in the ADINT/TSM profile could be as shown in the example below.

```
SERVER                server_a      # FDDI (server 1)
NODENAME              C21
PASSWORDREQUIRED     yes
FULLSESSIONS         2
UPDATESESSIONS       2
LOGSESSIONS          1
FULLMANAGEMENTCLASS  mgmtclass_a
UPDATEMANAGEMENTCLASS mgmtclass_b
LOGMANAGEMENTCLASS   mgmtclass_c

      SERVER                server_b      # FDDI (server 2)
NODENAME              C21
PASSWORDREQUIRED     yes
FULLSESSIONS         2
UPDATESESSIONS       2
LOGSESSIONS          1
FULLMANAGEMENTCLASS  mgmtclass_d
UPDATEMANAGEMENTCLASS mgmtclass_e
LOGMANAGEMENTCLASS   mgmtclass_f
```

Because a 4 session database backup is started, ADINT/TSM will start 2 sessions as defined in SERVER statement `server_a` and 2 sessions as defined in SERVER statement `server_b`. The sessions will be split over the two TSM servers, 2 sessions per server.

---

## Appendix E. Duplicate LOG Copies

**Note:** Duplicate Log copies are supported with the purchased version only. The Try & Buy version will backup just one copy of the Log.

---

### Configuration Considerations

Before defining the most effective configuration for Log backup it is necessary to identify the failures against which the Logs should be protected, as already shown by table 1 on page 13.

In the context of the following discussion 'Log' stands for either a log file or a log space.

If REDOLOGCOPIES is set to 2, two different management classes (LOGMANAGEMENTCLASS) must be defined like

- 1 TSM server with 2 LOGMANAGEMENTCLASSes or
- 2 TSM servers (server statements) with 1 LOGMANAGEMENTCLASS each.

These Log management classes should point to different storage devices so that the Log copies are saved on different physical media.

For backup ADINT/TSM will send the Log copies to the 2 Log management classes in the sequence they are defined in the profile.

If LOGCOPIES is set to 2 and

- a single TSM server has been defined with only 1 Log management class, ADINT/TSM will terminate with an error
- 2 TSM servers have been defined with 2 Log management classes assigned to the 1<sup>st</sup> server, both copies will be saved on the 1<sup>st</sup>, none on the 2<sup>nd</sup> server

In case of a restore, ADINT/TSM will try to restore the first copy (1<sup>st</sup> LOGMANAGEMENTCLASS in profile) first. If an error occurs, e.g. tape or disk defect, transmission error, server not available, etc., ADINT/TSM will switch to the second copy. If the second copy can't be restored either, this particular restore operation will end with an error.

The ADINT/TSM query function will display log backups with multiple copies as [2 of 1], which means 2 copies of 1 log file were saved.

---

## Configuration Examples

### Scenario 1: Duplicate Log copies with 1 TSM server

1<sup>st</sup> copy - mgmtclass c

2<sup>nd</sup> copy - mgmtclass d

```
o
REDOLOGCOPIES          2
.
SERVER                  server_a
  NODENAME              C21
  PASSWORDREQUIRED      yes
FULLSESSIONS           2
UPDATESESSIONS         2
LOGSESSIONS            1
FULLMANAGEMENTCLASS    mgmtclass_a
UPDATEMANAGEMENTCLASS  mgmtclass_b
LOGMANAGEMENTCLASS    mgmtclass_c mgmtclass_d
```

### Scenario 2: Duplicate Log copies with 2 TSM servers

1<sup>st</sup> copy - server a, mgmtclass c

2<sup>nd</sup> copy - server b, mgmtclass f

```
REDOLOGCOPIES          2
.
SERVER                  server_a
  NODENAME              C21
  PASSWORDREQUIRED      yes
FULLSESSIONS           2
UPDATESESSIONS         2
LOGSESSIONS            1
FULLMANAGEMENTCLASS    mgmtclass_a
UPDATEMANAGEMENTCLASS  mgmtclass_b
LOGMANAGEMENTCLASS    mgmtclass_c

SERVER                  server_b
  NODENAME              C21
  PASSWORDREQUIRED      yes
FULLSESSIONS           2
UPDATESESSIONS         2
LOGSESSIONS            1
FULLMANAGEMENTCLASS    mgmtclass_d
UPDATEMANAGEMENTCLASS  mgmtclass_e
LOGMANAGEMENTCLASS    mgmtclass_f
```

**Scenario 3:** Duplicate Log copies with 2 TSM servers and additional HA

Both servers up: 1<sup>st</sup> copy - server a, mgmtclass c

2<sup>nd</sup> copy - server b, mgmtclass f

Server a down: 1<sup>st</sup> copy - server b, mgmtclass f

2<sup>nd</sup> copy - server b, mgmtclass g

```
SERVER                server_a
NODENAME              C21
PASSWORDREQUIRED     yes
FULLSESSIONS         2
UPDATESESSIONS       2
LOGSESSIONS          1
FULLMANAGEMENTCLASS  mgmtclass_a
UPDATEMANAGEMENTCLASS mgmtclass_b
LOGMANAGEMENTCLASS   mgmtclass_c

SERVER                server_b
NODENAME              C21
PASSWORDREQUIRED     yes
FULLSESSIONS         2
UPDATESESSIONS       2
LOGSESSIONS          1
FULLMANAGEMENTCLASS  mgmtclass_d
UPDATEMANAGEMENTCLASS mgmtclass_e
LOGMANAGEMENTCLASS   mgmtclass_f  mgmtclass g
```

---

## Appendix F. Sample TSM Profiles (UNIX)

---

### Client User Option File Sample (dsm.opt)

```
*****
*
*   Tivoli Distributed Storage Manager
*
*   Sample Client User Options file for UNIX
*
*****

Servername      server_a
Tapeprompt      No
DOM             /usr/sap /sapmnt/C21 /usr/sap/trans /maxdb/C21
```

---

### Client System Option File Sample (dsm.sys)

```
*****
*
*   Tivoli Distributed Storage Manager
*
*   Sample Client System Options file for UNIX
*
*****

Servername      server_a
COMMmethod      TCPip
TCPport         1500
TCPserveraddress xxx.xxx.xxx.xxx
TCPbuffsize     32
TCPwindow       24
Compression     Off
InclExcl        /usr/tivoli/tsm/client/api/bin/inclexcl.list
ErrorLogName    /maxdb/adint/tsmapierror.log

Servername      server_b
COMMmethod      TCPip
TCPport         1500
TCPserveraddress yyy.yyy.yyy.yyy
TCPbuffsize     32
TCPwindow       24
Compression     Off
InclExcl        /usr/tivoli/tsm/client/api/bin/inclexcl.list
ErrorLogName    /maxdb/adint/tsmapierror.log
```

---

## Include/Exclude List Sample

```
* -----
* inclexcl.list
* Sample include/exclude list
* -----
* Task:
* Include/Exclude list of files and directories for TSM incremental backups
* -----
*      *****      NOTE      *****      NOTE      *****      NOTE      *****
*      This file is intended only as a model and should be
*      carefully tailored to the needs of the specific site.
*      *****      NOTE      *****      NOTE      *****      NOTE      *****
* -----
*
* For all UNIX systems
*
exclude /unix
exclude /.../core
exclude /u/.../*.sh_history
exclude /home/.../*.sh_history
*
* Note: It is recommended to perform system backups on a regular
*       basis. Consequently, you can exclude at least the following
*       directories:
*
exclude /usr/games/.../*
exclude /usr/bin/.../*
exclude /usr/lbin/.../*
exclude /usr/sbin/.../*
exclude /usr/sbin/.../*
* -----
*
* For those using AFS, exclude the cache filesystem or file
*
* exclude /usr/vice/cache/*
* exclude /var/vice/cache/*
* or
* exclude /afscfs
* -----
*
* This should be backed up using SAP maxdb/ backup techniques
*
exclude /maxdb/C21/data*/.../*
exclude /maxdb/C21/log*/.../*
* -----
*
* With the above include/exclude list we implicitly include everything not
* excluded above. Especially for SAP R/3 this means including:
*
*   /sapmnt/C21      > 300 MB
*   /usr/sap         > 50 MB
*   /maxdb/C21      > 200 MB
* and UNIX related  > 350 MB
* -----
```

---

## Appendix G. Sample TSM Profiles (Windows)

---

### Client User Option File Sample (dsm.opt)

The TSM client programs require a file `dsm.opt` containing standard client user options. The full file name is set in the environment variable `DSMI_CONFIG`.

```
*****
* DSM.OPT (for ADINT/TSM)
*
* ADINT/TSM requires that a file 'dsm.opt' is present, although its
* contents are ignored.
* This means that this file may be empty (like this file).
* The information about a TSM server is obtained
* from the corresponding client option file <server>.opt.
* ADINT/TSM inspects the environment variable DSMI_CONFIG to obtain the
* full file name of 'dsm.opt'.
*
* Note:
* The standard Tivoli Storage Manager client programs also use a file
* 'dsm.opt', but the full file name of this client user option file is
* set in the environment variable DSMI_CONFIG.
* This file is called the TSM client user option file.
* Please see the TSM documentation for details.
*****
ErrorLogName      c:\maxdb\adint\tsmapierror.log
```

---

### Client Option File Sample (<server>.opt)

ADINT/TSM requires for each TSM server a corresponding client option file `<server>.opt`. All these files must reside in one directory, and this directory must contain a file `dsm.opt`, whose full file name is set in the environment variable `DSMI_CONFIG`.

The information of this `dsm.opt` file is not used by ADINT/TSM, but by the TSM API.

```
*****
* SERVER.OPT
*
* ADINT/TSM obtains the necessary information of Tivoli Storage Manager
* server 'server' from a client option file called '<server>.opt'.
* For each TSM server a corresponding client option file is required.
* Note: This file contains the client options for the Tivoli Storage Manager
* server called 'server_a', please see the TSM documentation for details.
*****
COMMethod          TCPIP
COMPression        OFF
NODEname           C21
TCPPort            1500
TCPServeraddress   xxx.xxx.xxx.xxx
PASSWORDACCESS     PROMPT
TCPBUFFSIZE        31
TCPWINDOWSIZE      32
DISKBUFFSIZE       32
```

---

## Include/Exclude List Sample

```
*****
* This sample Include-Exclude list is used for incremental backups of
* file systems by the TSM command-line backup client.
* Therefore the name of this file has to be set under the keyword InclExcl
* in the standard TSM client user option file "dsm.opt".
*
* Since the backup of the SAP MaxDB database is done by ADINT/TSM and not by
* TSM command-line backup client, the SAP MaxDB database
* should be excluded from backups by the TSM
* command-line backup client.
*
* Note 1:
* The environment variable DSM_CONFIG contains the full file name of
* the TSM client user option file "dsm.opt".
* Note 2:
* This Include-Exclude is not used by ADINT/TSM.
*
*****
Exclude *:\...\*.swp
Exclude *:\...\*.obj
Exclude *:\...\*.csm
Exclude *:\...\*.dsk
Exclude *:\...\*.bak
Exclude *:\...\win386.swp
Exclude *:\...\386spart.par
Exclude *:\...\pagefile.sys
Exclude *:\...\*.par
Exclude *:\...\SYSTEM32\CONFIG\*.*
Exclude *:\...\SYSTEM32\CONFIG\...\*
Exclude *:\IBMBIO.COM
Exclude *:\IBMDOS.COM
*
*Exclude the following SAP MaxDB database files:
*
Exclude *:\maxdb\C21\data*\...\*
Exclude *:\maxdb\C21\log*\...\*
```

---

## Appendix H. Items of Backup Schedules (UNIX)

Under UNIX, crontab starts jobs (cron.job) at predefined times. In the example below, crontab starts two shell scripts, backup.ksh and archive.ksh.

---

### Crontab File Sample

```
#-----
# crontab.sample:
# Sample crontab file to be included in the root crontab jobs.
#-----
# Task:
# Submits backup/archive commands at regulary scheduled intervals
# using two simple shell scripts containing SAP MaxDB backup/archive
# commands and TSM commands.
#-----
#
# Note: this file is intended only as a model and should be carefully
# tailored to the needs of the specific installation.
#-----
#
# Remarks on the crontab file format:
#
# Each crontab file entry consists of a line with six fields, separated
# by spaces and tabs, that contain, respectively:
# - the minute (0 through 59)
# - the hour (0 through 23)
# - the day of the month (1 through 31)
# - the month of the year (1 through 12)
# - the day of the week (0 through 6 for Sunday through Saturday)
# - the shell command.
# Each of these fields can contain the following:
# - a number in the specified range
# - two numbers separated by a dash to indicate an inclusive range
# - a list of numbers separated by commas
# - an * (asterisk); meaning all allowed values.
#-----
#
# For the following examples, the system ID of the SAP MaxDB database is
# assumed to be 'C21', the username 'sqdC21' and the servername
# 'sapserver'.
#-----
# Full database backup, scheduled every Friday at 8:00 p.m.
#
0 20 * * 5 /usr/bin/su - sqdC21 -c "/maxdb/C21/scripts/backup.ksh"
#-----
# Save logs, scheduled twice a day at 11:30 a.m. and at 5:30 p.m.
# Monday through Friday
30 11,17 * * 1-5 /usr/bin/su - sqdc21 -c "/maxdb/C21/scripts/archive.ksh"
#
```

---

## Full Offline Backup Shell Script Sample

```
#!/bin/ksh
# -----
# backup.ksh:
# Sample SAP MaxDB database backup shell script
# -----
# Task:
# Invokes a SAP MaxDB backup in order to perform a full online backup
# -----
# Note: this script is intended as a sample only and should be carefully
# tailored to the needs of the specific installation.
# -----
# For the following examples, the system id (alias) of the SAP MaxDB database is
# assumed to be 'C21'.
# -----
# Remarks on the parameters of dbmcli:
# -d                database name (SID)
# -u                user, password
# -n                name of database server
# -uUTL             opens a SAP MaxDB utility session
# -c                command
# -----
# -----COMMAND-----
dbmcli -d C21 -u dbm,dbm -n sapserver -uUTL -c backup_start ADSM_full recovery DATA
```

---

## Log Space Backup Shell Script Sample

```
#!/bin/ksh
# -----
# archive.ksh:
# Sample SAP MaxDB log backup shell script
# -----
# Task:
# Invokes a SAP MaxDB log backup in order to perform an archive of the
# SAP MaxDB log space
# -----
# Note: this file is intended only as a model and should be carefully
# tailored to the needs of the specific installation.
# -----
# For the following examples, the system id (alias) of the SAP MaxDB database is
# assumed to be 'C21'.
# -----
# Remarks on the parameters of dbmcli:
# -d                database name (SID)
# -u                user, password
# -n                name of database server
# -uUTL             opens a SAP MaxDB utility session
# -c                command
# -----
# -----COMMAND-----
dbmcli -d C21 -u dbm,dbm -n sapserver -uUTL -c backup_start ADSM_log LOG
```

---

## Appendix I. Items of Backup Schedules (Windows)

To start jobs on a Windows system at predefined times, it is necessary to have the Schedule service running. It is started with: `net start schedule`. After the Schedule service is running, jobs are scheduled with the `at` command.

In the following example, the jobs `backup.cmd` and `archive.cmd` are started.

---

### Schedule Batch Sample

```
@echo off
rem -----
rem file name: schedule.sample
rem -----
rem Task:
rem Submits backup/archive commands at regularly scheduled intervals
rem using two simple batch files containing backup/archive commands.
rem -----
rem
rem Note: this file is intended only as a sample and should be carefully
rem tailored to the needs of the specific installation.
rem
rem -----
rem For a full reference of the AT command please see the Windows help.
rem -----
rem
rem For the following examples, the system ID of the SAP MaxDB database
rem is assumed to be "C21".
rem
rem -----
rem Full online database backup, scheduled every Friday at 8:00 p.m.
rem
rem at 20:00 /every:f cmd /c c:\maxdb\C21\scripts\backup.cmd
rem
rem -----
rem Save redo logs, scheduled twice a day at 11:30 a.m. and at 5:30 p.m.
rem Monday through Friday
rem
rem at 11:30 /every:m,t,w,th,f cmd /c c:\maxdb\C21\scripts\archive.cmd
rem ----- end of schedule.sample -----
```

---

### Full Offline Backup Batch File Sample

```
@echo off
rem Full Offline Backup batch file:
rem -----
rem file name: backup.cmd
rem -----
rem Sample SAP MaxDB database backup batch file
rem -----
rem Task:
rem Invokes a SAP MaxDB backup in order to perform a full online backup
rem -----
```

```

rem
rem Note: this file is intended only as a model and should be carefully
rem tailored to the needs of the specific installation.
rem
rem -----
rem
rem For the following examples, the system ID of the SAP MaxDB database
rem is assumed to be "C21".
rem
rem -----
rem Remarks on the parameters of dbmcli:
rem
rem -d                database name (SID)
rem -u                user, password
rem -n                name of database server
rem -uUTL             opens a SAP MaxDB utility session
rem -c                command
rem
rem -----COMMAND-----
dbmcli -d C21 -u dbm,dbm -n sapserver -uUTL -c backup_start ADSM_data recovery DATA

```

---

## Log Space Backup Batch File Sample

```

@echo off
rem -----
rem file name: archive.cmd
rem -----
rem Sample SAP MaxDB log backup batch file
rem -----
rem Task:
rem Invokes a SAP MaxDB log backup in order to perform an archive of the
rem SAP MaxDB log space
rem -----
rem ***** NOTE ***** NOTE ***** NOTE *****
rem
rem This script is intended only as a model and should be
rem carefully tailored to the needs of the specific site.
rem
rem ***** NOTE ***** NOTE ***** NOTE *****
rem -----
rem
rem For the following examples, the system id (alias) of the SAP MaxDB
rem database is assumed to be 'C21'.
rem
rem -----
rem Remarks on the parameters of dbmcli:
rem
rem -d                database name (SID)
rem -u                user, password
rem -n                name of database server
rem -uUTL             opens a SAP MaxDB utility session
rem -c                command
rem
rem -----COMMAND-----
dbmcli -d C21 -u dbm,dbm -n sapserver -uUTL -c backup_start ADSM_log LOG

```

## Appendix J. Setup and Configuration Summary

The following example gives a summary of all setup and configuration steps necessary to backup SAP MaxDB databases with ADINT/TSM in a UNIX environment. The same basic steps also apply to Windows except for the different path nomenclature ('/' vs. '\') and drive). Below list shows the configuration data assumed for the example. It is advisable to prepare such a list for an actual configuration prior to starting the ADINT/TSM installation and setup.

TSM API installation directory	/usr/tivoli/tsm/client/api/bin64
ADINT/TSM installation directory	/usr/tivoli/tsm/adint64
ADINT/TSM configuration directory	/maxdb/adint
SAP MaxDB user	sdb
SAP MaxDB group	sdba
SAP MaxDB server name	dbserve1
Database SID	C21
TSM server name	server_a
TSM node name	C21
TSM node password	<the TSM node password>
TSM management class for database data	mgmtclass_a
TSM management class for incremental database data	mgmtclass_b
TSM management class for transaction log data	mgmtclass_c

The installer selects the proper ADINT/TSM bit width based on the platform (32 bit for all Windows platforms , 64 bit for all UNIX and LINUX).

### (1) Prerequisites

- SAP MaxDB is installed
- TSM API is installed and configured on the database server.

**Note:** Check for the proper bit width to match the bit width of ADINT/TSM:  
32 bit on all Windows platforms, 64 bit on all UNIX platforms

- Ensure the the following are set in the server stanza for TSM server 'server\_a' (UNIX: `dsm.sys`, Windows: `server_a.opt`):
  - password access method is set to `prompt`  
This can be changed (if desired) after the initial ADINT/TSM password has been set successfully (see step 3 below).
  - The location for the API error log is set to the ADINT/TSM configuration path :  
`ErrorLogName /maxdb/adint/tsmapiererror.log`

(2) **ADINT/TSM installation** (see also 'Installing ADINT/TSM' on page 25)

- Uninstall the old version of ADINT/TSM
- Logon as 'root' (or as 'administrator' on Windows) at the database server system
- start the installation program which will guide you through the installation process. After completion you will have installed
  - executables and reference files in the installation path
  - configuration work files in the configuration pathand you have configured a basic connection to the TSM server in the ADINT/TSM profile

(3) **Complete the TSM server setup** (see 'Password Handling' on p. 27)

- Set the ADINT/TSM password for TSM authentication by issuing:

```
adint2 -x
```

After the dialog comes up enter the password for the TSM node, e.g. 'server\_a', specified in the ADINT/TSM work profile `initC21.utl`

(4) **SAP MaxDB setup** (see also 'Connecting ADINT/TSM with SAP MaxDB page 29)

- Register ADINT/TSM to database C21:

```
dbmcli -d C21 -n dbserve1 -u dbm,dbm dbm_configset -raw ADINT
/usr/tivoli/tsm/adint64
dbmcli -d C21 -n dbserve1 -u dbm,dbm dbm_configset -raw ADA_OPT
/maxdb/adint/initC21.utl
```

- Create backup media (see also 'Backup Media' on page 31):

```
dbmcli -d C21 -u dbm,dbm -n dbserve1 -uUTL
```

1. for database backups

SAP MaxDB version 7.4 and 7.5:

```
medium_put ADSM_data /maxdb/p01_data PIPE DATA
```

SAP MaxDB version 7.6 and higher:

```
medium_put FullData /maxDB/p01_data PIPE DATA 0 8 NO NO \"\" TSM
```

2. for log backups

SAP MaxDB version 7.4 and 7.5:

```
medium_put ADSM_log /maxdb/p02_log PIPE LOG
```

SAP MaxDB version 7.6 and higher:

```
medium_put LogData /maxdb/p02_log PIPE LOG 0 8 NO NO \"\" TSM
```

- Check if the backup media are created:

```
medium_getall
```

- perform a test backup of SAP MaxDB C21 (see also 'Performing a Backup' on page 33):

```
dbmcli -d C21 -u dbm,dbm -n dbserve1 -uUTL  
backup_start ADSM_data recovery DATA
```

#### (5) Configure ADINT/TSM for the desired functionality

- install the usage key using the following ADINT/TSM manual command

```
adint2 -l
```

**Note:** Do not modify the configuration file internparamfile.adi. This may cause malfunction of ADINT/TSM.

- Edit the ADINT/TSM work profile in the configuration path and set the required parameter values. See 'Appendix B. ADINT/TSM Profile' on page Fehler: Referenz nicht gefunden for an overview of the parameters with a short description. Chapter 1 of this guide describes the functions provided by ADINT/TSM with references to various attachments for more detailed descriptions. Additional information and best practices hints can be found in a White Paper 'Best Practices for SAP MaxDB™ Backup and Recovery using IBM Tivoli Storage Manager', which can be downloaded from the Web Site [www-05.ibm.com/de/entwicklung/esd](http://www-05.ibm.com/de/entwicklung/esd)

---

## Appendix K. Cloning a SAP MaxDB with ADINT/TSM

Cloning of SAP MaxDB databases with ADINT/TSM requires some preparation steps. These are:

1. Customizing of ADINT/TSM
2. Customizing of target SAP MaxDB database server

---

### Customizing Steps

As a prerequisite it is assumed, that on the target database server the following software is installed:

SAP MaxDB  
TSM API  
ADINT/TSM

For the cloning purposes ADINT/TSM on the one side and SAP MaxDB on the other side have to be customized in a special way.

### ADINT/TSM setup

After installing ADINT/TSM on the target database server, the ADINT/TSM profile must be adapted accordingly. That is necessary to be able to find and restore the backup images created on the source database server.

The profile of ADINT/TSM contains a TSM server section, which represents the TSM server name, the TSM node name and TSM management classes to be used for database backups and restores.

All these TSM related entries in the ADINT/TSM profile on the target database server must match to the entries of the ADINT/TSM profile on the **source database server** for cloning purposes.

After adapting these settings, the ADINT/TSM password on the target database server has to be set. Use the following command:

```
adint2 -x
```

## SAP MaxDB setup

A prerequisite for SAP MaxDB cloning with ADINT/TSM is an initial, existing database on the target database server.

**Note:** The database on the target database server must be created by the same SAP MaxDB user as the database on the source database server!

Further it is required, that the SAP MaxDB backup media to be used for the cloning on the target database server are of the same name as the backup media on the source database server.

The SAP MaxDB backup media can be queried with the DBMCLI command:

```
medium_getall
```

---

## Database Cloning Procedure

Prior to starting a SAP MaxDB restore (cloning) the External Backup ID (EBID) has to be determined, which is to be provided as a parameter for the restore command.

Log on to DBMCLI (if not already done) and issue the following command:

```
backup_ext_ids_get AD SM [<DB>] [<server>]
```

Where

<DB>

is the database name (SID) of the **source** database

<server>

is the name of the **source** database server

**Note:** Use the database name (SID) of the source database and the name of the source database server!

To display the EBID use the following DBMCLI command:

```
backup_ext_ids_list
```

Pick up the appropriate EBID displayed and go ahead performing the restore/recovery of that EBID as described in the ADINT/TSM manual "Chapter 4. Using ADINT/TSM with SAP MaxDB DBMCLI - Restoring SAP MaxDB with ADINT/TSM and DBMCLI".

