Tivoli Storage Manager
for Windows

Quick Start

Version 5 Release 1
Quick Start

Version 5  Release 1
Summary of Changes for Tivoli Storage Manager Version 5

Changes for Version 5 Release 1—March 2002

The following changes have been made to the product for this edition:

**New Wizard-Based Minimal Configuration Option**

The new minimal configuration option is intended to help beginning users more easily install and run Tivoli Storage Manager for evaluation. It should also benefit experienced users. The minimal configuration option uses only two wizards:

- Initial Configuration Task List
- Server Initialization

Users can select either a Standard Configuration or a Minimal Configuration option from the Initial Configuration Task List.

See Appendix A: Performing a Minimal Configuration for more information.

**Server-Free Data Movement**

Server-free data movement uses the SCSI-3 extended copy command for full-volume backup and restore of client data stored on dedicated SAN-attached disk drives. It provides the following advantages:

- Reduces Tivoli Storage Manager client and server CPU utilization.
- Eliminates data movement on the LAN.
- Improves performance by taking advantage of high-speed fibre channel devices, avoiding slower network connections and costly copy operations within the client and server.
- Allows the server to handle more concurrent client connections and server operations.

See Tivoli® Storage Manager Administrator’s Reference.

**Changes in Defining Drives and Libraries**

Device special file names and External Library managers are now specified in the DEFINE PATH and UPDATE PATH commands, rather than in the DEFINE DRIVE, UPDATE DRIVE, DEFINE LIBRARY, and UPDATE LIBRARY commands.

See Adding a Manual Library, Adding an Automated Tape Library and Tivoli Storage Manager Administrator’s Reference.

**Moving Data by Node**

You can use the MOVE NODEDATA command to move data in a sequential-access storage pool for one or more nodes, or move selected file spaces for a single node. You can also use MOVE NODEDATA to move data to another storage pool.

See Tivoli Storage Manager Administrator’s Reference.

**Support for Simultaneous Writes to Primary and Copy Storage Pools**

You can specify copy storage pools in a primary storage pool definition.
When a client backs up, archives, or migrates a file, the file is written to
the primary storage pool and is simultaneously stored into each copy
storage pool.

See Tivoli Storage Manager Administrator’s Reference.

Data Validation with Cyclic Redundancy Checking

Tivoli Storage Manager provides the option of specifying whether a cyclic
redundancy check (CRC) is performed during a client session with the
server, or for storage pools. The server validates the data by using a cyclic
redundancy check which can help identify data corruption. Data validation
can be enabled for one or all of the following:

- Tivoli Storage Manager client nodes at Version 5.1.
- Tivoli Storage Manager storage agents at Version 5.1.
- Storage pools

See Tivoli Storage Manager Managed System for SAN Storage Agent User’s
Guide and Tivoli Storage Manager Administrator’s Guide for more information.

New Licensing Method

The new licensing method enables you to register the exact number of
licenses that are required, rather than in increments of 1, 5, 10, and 50.

See Licensing Wizard and Tivoli Storage Manager Administrator’s Reference.

Support for Windows® XP and Windows.NET Tivoli Storage Manager

Backup-Archive Clients

Support is now added for Windows XP Tivoli Storage Manager
backup-archive clients that run in 64-bit mode. New support is provided
for Windows.NET Tivoli Storage Manager backup-archive clients that run
in 32- and 64-bit mode. These two Windows platforms are a Unicode-only
version of the client.

See Tivoli Storage Manager for Windows Using the Backup-Archive Clients.

Communication Method

Tivoli Storage Manager for Windows no longer supports the Internetwork
Packet Exchange (IPX)/SPX and NETBIOS communication methods. The
COMMMETHOD server option is updated to reflect this change.

See Tivoli Storage Manager Administrator’s Reference.
Chapter 1. Introducing Tivoli Storage Manager

Tivoli Storage Manager provides automated, policy-based, distributed data and storage management for file servers and workstations in an enterprise network environment. The base functions provided by TSM include:

**Backup and Restore:**

The backup process creates a copy of file or application data that can be recovered if the original data is lost or destroyed. Unlike other backup applications, TSM implements a progressive backup methodology to move data quickly and reliably. Using progressive backup, the number of file versions maintained by TSM and the length of time they are retained can be specified by the storage administrator. Refer to "Common Backup Methodologies" on page 6 for more information.

Backups can be scheduled, performed manually from the TSM client interface, or performed remotely using a Web-based interface.

The restore process transfers a backup data copy from TSM server-managed storage onto a designated machine.

**Archive and Retrieval:**

The archive process creates a copy of a file or a set of files and stores it as a unique object for a specified period of time. This function is useful for maintaining copies of vital records for historical purposes.

Like the backup process, the archive process can be scheduled, performed manually from the TSM client interface, or performed remotely using a Web-based interface.

The retrieval process transfers the archival data copy onto a designated machine.

**Instant Archive and Rapid Recovery:**

Tivoli Storage Manager allows for the creation of a complete set of client files, called a backup set, on the TSM server system using the most recent backup versions stored by the server. In a process called Instant Archive, a backup set is used to retain a snapshot of a client file system for a designated period of time. The Rapid Recovery process allow you to copy backup sets onto portable media for LAN-free recovery of a client system.

Tivoli Storage Manager also offers a number of separately licensed optional features. These include:

**Disaster Recovery Manager:**

Planning for disaster recovery involves implementing and automating the processes needed to recover from a major loss of enterprise infrastructure and data. These processes can include moving data to an offsite storage location, rebuilding the infrastructure, and reloading data as quickly as possible. Disaster Recovery Manager (DRM) facilitates the creation and testing of a disaster recovery plan by providing scripts and procedures for automating the restoration process. DRM also facilitates the tracking of media stored offsite.

**Tivoli Space Manager:**

This feature provides for the automatic and transparent movement of operational data from a client system to server-managed storage. This
process, called Hierarchical Space Management (HSM), is implemented as a client installation and controlled by policy defined to the TSM server. HSM frees up space on a client machine by using distributed storage media as a virtual hard drive for that machine. Files are automatically moved and stored according to size, age, and usage. When a user accesses this data, it is dynamically and transparently restored to the client machine.

TSM Architecture

Tivoli Storage Manager is implemented as a client/server software application. TSM uses policies to manage the movement of data between clients, servers, and storage devices. Table 1 lists the two primary TSM components.

Table 1. Primary TSM Components

<table>
<thead>
<tr>
<th>Component</th>
<th>For more information</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSM Server</td>
<td>Refer to &quot;TSM Server Overview&quot;</td>
</tr>
<tr>
<td>TSM Client</td>
<td>Refer to &quot;TSM Client Overview&quot; on page 4</td>
</tr>
</tbody>
</table>

TSM Server Overview

The TSM server component is installed on the computer that manages storage devices. The TSM server provides the following functions:

- Data management
- Storage device and media management
- Reporting and monitoring functions
- System security

The TSM server application is supported by a relational database that is specifically designed to manage a data storage environment. The server database operates transparently, requiring minimal administrative oversight. The server relies on the database to maintain an inventory of metadata associated with stored data objects. The database is not used to store actual client data, which is maintained in server-managed storage.

All database transactions are written to an external log file called the recovery log. The recovery log can be used to restore the database if necessary.

TSM server operations are configured, controlled, and monitored using graphical or command-line interfaces. Some tasks can be performed several different ways, so the interface you use depends on the type of task and your preferences. Support for SQL SELECT statements and ODBC data transfer is also available for advanced database management and reporting.

Data Management

The TSM server uses the database to intelligently map business goals with storage management policies and procedures. The TSM server tracks the origin and location of each client data copy. Policies defined to the TSM server determine how data copies will be stored, migrated, and eventually replaced with newer data.

TSM typically maintains several incrementally modified versions of client data files, up to a maximum number defined by the administrator. When the threshold number of files is reached, the oldest file version is marked for expiration. A typical TSM data management scenario might look something like this:

A new file is created on a TSM client workstation on a Monday morning.
A scheduled incremental backup of the workstation runs Monday evening.
The TSM server stores the file copy and marks it as ACTIVE.

The next scheduled incremental backup of the workstation runs Tuesday evening.
The TSM server compares the ACTIVE file copy with the current version on the client node to see if the file has been modified. If so, the modified version is backed up and becomes the ACTIVE copy. The previous ACTIVE copy is marked as INACTIVE. TSM will continue to store a new ACTIVE copy and inactivate previous copies until the number of inactivated copies reaches a limit you specify or the file is deleted from the client node.

The next scheduled incremental backup of the workstation runs Wednesday evening.

- If the number of INACTIVE file versions reaches the specified limit: the oldest INACTIVE file copy is deleted from TSM storage and can no longer be restored.
- If the file has been deleted from the client node: all stored copies of the file are marked INACTIVE and become eligible for deletion. You can choose to maintain INACTIVE file versions indefinitely or specify a time limit.
- If a file has been created and never modified or deleted: the ACTIVE file version will never expire. TSM will maintain its copy of this file indefinitely.

During expiration processing, the TSM server deletes expired files from storage media and removes associated metadata from the database. Refer to “Common Backup Methodologies” on page 6 for more information.

Storage Device and Media Management
The TSM server provides management function for storage media and devices. A device driver is provided to run a wide variety of disk, optical, tape, and robotic storage devices. Many native device drivers can also be used with TSM. Refer to the TSM Web site at http://www.tivoli.com/support/storage_mgr/tivolimain.html for a complete list of supported storage devices.

During ongoing TSM operation, expired files are automatically deleted from storage media, causing volumes to become fragmented. When an administrator-defined threshold of available space is reached, TSM automatically reclaims the volume by consolidating its active files and writing them to another volume. The reclaimed volume is returned to the pool of available storage media for reuse. Refer to the chapter on media management in the Administrator’s Guide for more information.

TSM can be used with an external media manager like Windows Removable Storage Manager (RSM) to extend media and device management function. TSM also provides an external library manager interface, which allows you to integrate TSM into third-party storage management environments. Refer to the Administrator’s Guide for more information.

Server Customization
TSM server operational parameters, including communications and performance settings, are defined in a server options file located in the server directory. TSM sets default values for many of the options during the initial configuration process. You can modify default options using a text editor, but the preferred method is to edit
the file using a graphical interface provided by the TSM Console. Refer to the 
Administrator’s Guide and Administrator’s Reference for more information about 
server options.

TSM server run-time settings are defined in the TSM server database. These 
include security, accounting, and activity log settings. TSM provides default values 
for these settings when the TSM server is initialized. Administrators can modify 
default settings using the administrative Web interface or the server command-line 
interface. Refer to the Administrator’s Guide for more information about server 
settings.

Standalon or Network Implementation
It is recommended that you install the TSM backup-archive client on the TSM 
server machine to help you validate your server configuration. A TSM server and 
client installed on the same machine can be used standalone to manage storage for 
that machine. More commonly, network-attached clients will be configured to 
backup data to the TSM server instance.

TSM Client Overview
The TSM client component sends data to, and retrieves data from, a TSM server. 
The TSM client must be installed on every machine that will transfer data to 
server-managed storage. The TSM server uses a unique node name to identify each 
TSM client instance. A password can be used to authenticate communications 
between the TSM client and server. Data can be recovered to the same client 
machine that initially transferred it, or to another client with a compatible file 
system format.

Client Customization
The TSM client basically consists of the software component and a customization 
file. This customization file, called the client options file, specifies client/server 
communications parameters and other TSM client settings. Client communications 
parameters must agree with those specified in the server options file. The client 
options file is located in the client directory and can be modified using a text 
editor. The client graphical interface also provides a wizard for editing this file.

Within the client options file, an include-exclude list can be specified. This list can be 
used to identify how specific files or directories will be processed during backup 
or archive operations. TSM will back up any file not specifically excluded. Refer to 

Some client options can also be defined in the TSM server database. Defining these 
client option sets allows for the centralized management of certain client operations. 
Refer to the Administrator’s Guide for more information.

Available Clients
There are several types of TSM clients available on a wide variety of platforms. 
The following list provides a brief description of some common TSM clients. For 
more detailed information, including installation and management instructions, 
refer to Backup-Archive Installation and User’s Guide.

Backup-archive Client
The backup-archive client provides standard TSM client function, which 
includes four operations: backup, restore, archive, and retrieve. These 
operations can be performed manually from the client machine or remotely 
using a web-based interface. Backup and archive operations can also be 
scheduled to run automatically.
An administrative client can be optionally installed with the backup archive client. The administrative client package consists of the TSM server command line, which can be used to remotely manage a TSM server from a network-attached machine. The administrative Web interface is also commonly referred to as a TSM administrative client. Both interfaces can be accessed from the TSM Console on the server machine. Refer to “TSM Interfaces” on page 14 for more information.

The other available TSM clients are based on the backup-archive client but offer additional specialized function.

**Tivoli Data Protection Client**

The Tivoli Data Protection (TDP) client, also called an application client, allows for the backup and restoration of data used by various business applications. On the Windows platform, support is provided for Lotus® Domino™, Microsoft® Exchange, and Microsoft SQL Server. The TDP client receives backup and restore requests from the business application and translates them for TSM server processing. Backup and restore processing can be done while the business application is on line. Refer to the Tivoli Data Protection documentation set for more information.

**Tivoli Space Manager Client**

The Tivoli Space Manager client, also called a Hierarchical Storage Management (HSM) client, transparently migrates data from the client hard drive to TSM server-managed storage. When the migrated data is accessed through the client file system, it is transparently recalled back onto the local disk. The migration and management of files is controlled by policy defined to the TSM server. End users can also explicitly migrate and recall data. HSM client function is fully integrated with TSM operational backup and archive functions.

**Application Programming Interface Client**

The Application Programming Interface (API) client allows you to create custom TSM client implementations. The API client can be used to integrate business applications, such as databases or groupware, into a TSM environment. Refer to *Tivoli Storage Manager Using the Application Program Interface* for more information.

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**How TSM Works**

TSM is a highly flexible and scalable product that provides the capability for fully managed storage. With TSM’s extensive functionality, however, comes a certain amount of complexity. It is important to take the time to learn and understand the TSM approach to storage management. TSM differs from other common storage solutions in several significant ways, including its client/server architecture, progressive backup methodology, and unique data and storage policy objects.

This section provides a high-level overview of the TSM product model, with an emphasis on its unique features. Table 2 describes the two interrelated discussions that make up the product model overview.

*Table 2. TSM Product Model Overview Topics*

<table>
<thead>
<tr>
<th>Overview topic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Data Management” on page 6</td>
<td>This section compares the TSM progressive backup methodology with other common approaches. TSM data management policy objects are also described.</td>
</tr>
</tbody>
</table>
Table 2. TSM Product Model Overview Topics (continued)

<table>
<thead>
<tr>
<th>Overview topic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Storage Device and Media Management” on page 10</td>
<td>This section describes TSM storage policy objects. TSM tape rotation, storage hierarchy, and data migration are also described. The storage pool, a fundamental TSM management object, is described in some detail.</td>
</tr>
</tbody>
</table>

For more detailed information about TSM, refer to “TSM Documentation” on page 29.

Data Management

The main difference between the data management approach of TSM and other commonly used systems is that TSM catalogs and controls data objects instead of simply relying on an operator to manage storage media. Data objects can include:

- Sub-file components, files, directories, or raw logical volumes that are backed up from client systems
- Blocks of client data that need to be archived for a fixed amount of time
- Tables or records from database applications

The way these data objects are handled is defined using data management policies. The use of policy to control data allows TSM to implement its unique backup methodology.

Common Backup Methodologies

Most backup products offer some variation of the three backup methodologies described in Table 3.

Table 3. Common Backup Methodologies

<table>
<thead>
<tr>
<th>Common Backup Methodology</th>
<th>How it Works</th>
<th>Drawbacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full backup</td>
<td>• Every file on a given computer or file system is copied whether or not it has changed since the last backup</td>
<td>• Large amounts of data are regularly moved. Generally not feasible in a networked environment</td>
</tr>
<tr>
<td>Full + incremental backup</td>
<td>• Full backups are done on a regular basis, for example, weekly</td>
<td>• Less data is regularly moved than in a Full backup, but restoring data can require retrieving multiple Incremental backup copies as well as the Full backup to recreate current file state</td>
</tr>
<tr>
<td>Full + differential backup</td>
<td>• Full backups are done on a regular basis, for example, weekly, weekly</td>
<td>• Better restore performance than in a Full + Incremental backup, because only two copies of data are required (the Full backup and the current Differential backup), but more data is regularly moved</td>
</tr>
</tbody>
</table>
You are probably familiar with one or more of these approaches. Before TSM, managing data required striking a balance between these approaches to achieve the desired level of recoverability and cost efficiency.

A major drawback of these common backup methodologies is that all data is moved on a regular basis, whether it has changed or not. If full backups are performed weekly, every byte of data is moved weekly. In contrast, Tivoli Storage Manager’s approach, called Progressive Backup, starts with a full backup, but then moves only changed data from that point on. Another full backup may never be required.

**Progressive Backup Methodology**

Progressive Backup can be thought of as combining the backup benefits of the incremental approach with the restore benefits of the differential approach. Files are backed up incrementally to reduce network traffic, while recovery media is consolidated to provide better restore performance. Together with the data management features provided by the TSM database, the progressive backup methodology reduces the potential for human error and helps enforce your storage management procedures. Table 4 describes the progressive backup methodology.

<table>
<thead>
<tr>
<th>TSM Backup Methodology</th>
<th>How it Works</th>
<th>Benefits</th>
</tr>
</thead>
</table>
| Progressive backup     | A Full backup is done only once  
|                        | After the Full backup, Incremental backups copy only files that have changed since the last backup  
|                        | Metadata associated with backup copies is inventoried in the TSM database. The number of backup copies stored and the length of time they are retained is specified by the storage administrator | Entirely eliminates redundant data backups  
|                        | TSM automatically releases expired file space to be overwritten; this reduces operator intervention and the chance of accidental overwrites of current data  
|                        | Over time, less data is moved than in Full + Incremental or Full + Differential backups, and data restoration is mediated by the database |

TSM allows for a great deal of flexibility in the implementation of a backup and restore strategy. This allows you to choose a practical configuration that best supports the kinds of recovery scenarios you expect to encounter. Some possible implementations include the following:

- Progressive backups can be combined with periodic full backups.
- Selective backups can be performed on-demand by users.
- Client or hardware data compression can be used.
- Client data can be collocated to minimize the number of media mounts required for recovery.
- File system or raw volume images can be backed up from client nodes, NAS file servers, or client-owned SAN-attached disk.
- You can create a portable backup set from TSM server storage, which can be copied to media and used to perform a LAN-free restore of a client system.

In any implementation, the TSM server always knows the location of the most current version of a given file, which reduces search times and improves the recovery process. Refer to the *Administrator’s Guide* for more information.
Data Management Policy

A TSM environment consists of three basic types of resources: client systems, data, and rules. The client systems generate the data, and the rules specify how that data will be managed. For example, in the case of TSM backup, rules define how many versions of a file should be kept and where they should be stored.

TSM uses policy to define the relationships between these three resource categories. Depending on your needs, TSM policy can be fairly simple or more complex.

TSM policy objects can be divided into two interrelated groups:

• The policy objects that map to your business environment and data management goals
• The policy objects that map to your storage media and devices

One way to begin thinking about TSM data management policy objects is to look at how they can reflect the organizational structure of your business environment. Table 5 introduces the TSM data management policy hierarchy, and provides examples of how you can use these policy objects to achieve your administrative goals:

Table 5. TSM Data Management Policy

<table>
<thead>
<tr>
<th>TSM Policy Object</th>
<th>Organizational Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy Domain</td>
<td>Could map to different categories of TSM client nodes within your organization. For example, you might set up different policy domains for UNIX-based file server machines and Windows-based workstations. These domains could be used to provide customized storage management and separate administrative control for each logical group.</td>
</tr>
<tr>
<td>Policy Set</td>
<td>You could use policy sets to create subsets of TSM client nodes within a domain. However, only one policy set can be active within a given policy domain at any time. Because of this restriction, many administrators implement just one policy set and focus their management effort on policy domains, management classes, and copy groups.</td>
</tr>
<tr>
<td>Management Class</td>
<td>Could map to different categories of data generated by your TSM client nodes. A management class contains one backup copy group, one archive copy group, or one of each. One management class in a policy set must be designated as the default. Additional management classes can be created and specified for use by individual TSM clients. For example, within the active policy set for the domain created for UNIX® server machines, you might set up one management class for general data (default) and one for directory structure information.</td>
</tr>
</tbody>
</table>
Table 5. TSM Data Management Policy (continued)

<table>
<thead>
<tr>
<th>TSM Policy Object</th>
<th>Organizational Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Copy Group</td>
<td>The working elements of TSM policy are defined in copy groups. These elements include the number of versions of TSM client files to be maintained and the amount of time those files will be stored. The other TSM data management policy objects are primarily used to provide implementation flexibility. There are two kinds of copy groups: backup and archive. For example, within the default management class created to handle general data for the UNIX server policy domain, you might set up a backup copy group that maintains three copies of existing data and stores those copies for 100 days. By default, backup data for any TSM client nodes associated with this domain will be managed according to these specifications.</td>
</tr>
</tbody>
</table>

Figure 1 shows how TSM uses these policy objects to manage client data.

Figure 1. How TSM Controls Backup, Archive, and Space Management

1. A client backs up, archives, or migrates a file. The file is bound to either the default management class or a management class specified in the client’s include-exclude list.
2. If, according to the management class, the file is eligible for backup, archive, or space management, the client sends the file and file information to the server.
3. The server checks the management class or copy group to determine where in server storage to store the file initially.

If enough space is not available in the initial storage pool, the server examines the next pool in the hierarchy and places the file there if space is available.

4. The server stores the file in the appropriate storage pool and stores information about the file in the database.

When files in server storage are migrated from one pool to another, the server updates the associated metadata in the database.

### Storage Device and Media Management

To store and manage data objects on various kinds of storage media and devices, TSM implements several logical entities to classify the available storage resources. Table 6 describes the TSM media and device policy set.

**Table 6. TSM Storage Device and Media Policy**

<table>
<thead>
<tr>
<th>TSM Policy Object</th>
<th>What it Represents</th>
</tr>
</thead>
</table>
| Volume            | Represents one physical or logical unit of storage media.  
|                   | For example, a volume can represent a tape or a disk partition.  
|                   | Each volume is associated with a single storage pool. |
| Storage Pool      | Represents a collection of available storage volumes of the same media type. TSM stores all managed data objects in storage pools. Storage pools are typically arranged in a hierarchy, with data migrating from one type of storage to another.  
|                   | For example, a storage pool with an 8mm tape device class consists of a number of 8mm tape volumes. Clients that need to back up data directly to 8mm tape are associated with this storage pool. Other client data might go first to a DISK storage pool, and then migrate to the 8mm storage pool.  
|                   | Each storage pool is associated with a single device class. |
| Device Class      | Represents the type of storage device that can use the volumes defined to a given storage pool.  
|                   | For example, an 8mm tape device class can be used to associate a storage pool with any library device that handles 8mm tape.  
|                   | Each removable media-type device class is associated with a single library. |
| Library           | Represents a specific storage device.  
|                   | For example, a library can represent a standalone drive, a set of standalone drives, a multiple-drive automated device, or a set of drives controlled by an external media manager. |
| Drive             | Represents a specific physical drive within a storage device.  
|                   | Each drive is associated with a single library. |
| Path              | Represents a data and control path from a source to a destination.  
|                   | To use a library or drive with TSM, a path must be defined between the device and either the TSM server or another designated data mover. |
Table 6. TSM Storage Device and Media Policy (continued)

<table>
<thead>
<tr>
<th>TSM Policy Object</th>
<th>What it Represents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Mover</td>
<td>Represents a SAN-attached device used to transfer TSM client data. Used only in a TSM server-free data movement or NDMP environment. For example, a NAS file server with attached storage must be defined as a data mover, so it can transfer client data to and from the storage device as required by the TSM server.</td>
</tr>
<tr>
<td>Disk</td>
<td>Represents SAN-attached disk space owned by a TSM client. Used only in a TSM server-free data movement environment.</td>
</tr>
</tbody>
</table>

Storage Hierarchy and Data Migration
The storage pool is the central element of the TSM storage management environment because it provides the link between TSM data and storage objects. TSM allows you to organize storage pools into one or more hierarchical structures. Each storage hierarchy can span multiple TSM server instances. Storage policy is used to migrate data objects automatically from one storage pool to another. This allows you to initially back up data to fast storage media like disk, and then migrate the data to slower, less expensive media like tape during off-peak hours. Refer to "Overview of Storage Pools" on page 5 and the Administrator's Guide for more information.

Tape Rotation
By providing policy objects that focus your management effort on data instead of media, TSM can help you fill in the gaps inherent in any tape rotation scheme. Instead of setting up a traditional tape rotation, you set up policy. Tape rotation, as it applies to TSM, can be thought of as the ongoing automated circulation of media through the storage management process. Once TSM selects an available tape, the tape is used and eventually reclaimed according to its associated policy.

Policy-based storage management takes a little time up front to understand and implement, but it allows for a great deal of automation and flexibility. Automating backup and recovery functions reduces the likelihood of human error, and also helps enforce data management goals. Refer to the chapter on managing media in the Administrator's Guide for more information.
Putting it All Together

Figure 2 summarizes the relationships between the physical device environment, TSM storage management objects, and TSM data management objects.

Figure 2. Putting it All Together

1  When a TSM client is registered, it is associated with a policy domain. The other TSM policy objects are defined within the policy domain.

2, 3  When the TSM client backs up or archives files, the data is bound to one
or more management classes in the domain’s active policy set. Backup and archive copy groups within the management class route the data to an appropriate storage pool.

The storage pool specifies where and how the client data will be stored. Storage pools are mapped to device classes, which represent devices. The storage pool contains volumes as indicated in the device type associated with the device class. For example, a storage pool that is mapped to a device class with a device type of 8MM contains only 8MM tapes.

All devices require a device class that specifies a device type. Removable media devices also require library and drive definitions, which enable TSM to mount and manage media.

Files that are initially stored in disk storage pools can migrate to tape storage pools if the pools are set up in a storage hierarchy.

**Automating TSM Operations**

You can define schedules to automate TSM server and client operations. A comprehensive and integrated set of schedules can provide the basis for efficient data management with little need for intervention during normal operations.

To schedule **TSM server operations**, you only need to create a schedule or set of schedules on the TSM server.

To schedule **TSM client operations**, you need to do two things:

- Create a schedule or set of schedules on the TSM server
- Install and start a scheduler component on the TSM client machine

Any of the following storage management tasks can be automated:

- Backup and restore
- Archive and retrieve
- TSM server administrative commands
- Running administrative scripts and macros

After defining a schedule for a client task, you must specify which clients can use the schedule. This task is called associating clients with schedules. You can associate all the nodes in a given policy domain, or just a subset. Schedule associations can be modified at any time.

To automate client operations, the scheduler component must be installed and configured on each TSM client machine. This is done with a wizard accessed from the backup-archive client graphical interface. The client scheduler runs as a service, which must be started after the scheduler has been configured. Refer to *Backup-Archive Installation and User’s Guide* for more information.
TSM Interfaces

TSM offers several configuration and management interfaces for both the client and server product components. Command line, graphical, and web-based interfaces are available on the Windows platform. There is some overlap in the function provided by these interfaces. This section provides an introduction to TSM server and client interfaces, including usage recommendations and access instructions. Table 7 and Table 8 introduce the TSM product interfaces.

Table 7. TSM Server Interfaces - Quick Reference

<table>
<thead>
<tr>
<th>TSM Server Interfaces</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;TSM Console&quot; on page 15</td>
<td>The primary interface for the TSM server. Provides access to all of the other TSM server interfaces and the web-based remote client interface.</td>
</tr>
<tr>
<td>&quot;Configuration and Management Wizards&quot; on page 17</td>
<td>Help you configure and manage your TSM server.</td>
</tr>
<tr>
<td>&quot;Administrative Web Interface&quot; on page 19</td>
<td>The recommended interface for ongoing TSM server administration.</td>
</tr>
<tr>
<td>&quot;Server Command Line&quot; on page 20</td>
<td>An alternate, character-based interface for ongoing TSM server administration.</td>
</tr>
<tr>
<td>&quot;Console Monitor&quot; on page 21</td>
<td>Supports the TSM server command line by displaying TSM messages, status, and reply requests.</td>
</tr>
</tbody>
</table>

Table 8. TSM Client Interfaces - Quick Reference

<table>
<thead>
<tr>
<th>TSM Client Interfaces</th>
<th>Usage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Client Graphical Interface&quot; on page 22</td>
<td>The primary end user interface for manually performing TSM client operations.</td>
</tr>
<tr>
<td>&quot;Client Command Line&quot; on page 23</td>
<td>A character-based administrative interface.</td>
</tr>
<tr>
<td>&quot;Web Backup-Archive Client&quot; on page 24</td>
<td>A Web-based interface for manually performing TSM client operations remotely.</td>
</tr>
</tbody>
</table>
TSM Server Interfaces

The central server interface is the TSM Management Console (TSM Console). All of the other server interfaces and the Web backup-archive client interface can be accessed from the TSM Console.

TSM Console

The TSM Console is a Microsoft Management Console (MMC) snap-in that provides the following features:

- A Windows-style tree view of network computers on which TSM resources are installed
- Network scan utilities that can be used to locate TSM client and server nodes for remote management
- A Net Send feature that can be used to notify operators of TSM mount requests and status messages
- TSM server configuration and management wizards
- Command line and web-based interfaces for TSM server management
- A web-based interface that can be used to remotely backup and restore client data
- Reporting functions for TSM server and client instances, device drivers, and schedules

The MMC framework allows you to create custom consoles that can incorporate different toolsets to support various administrative roles. For more information about MMC components and features, refer to the Windows 2000 Online Help.

For information about using the TSM Console, refer to the online help.

Recommended Use

The TSM Console is intended to be used as the primary interface for the TSM server. In addition to the configuration and management functions provided by the console itself, it provides access to all of the other TSM server interfaces and the TSM web-based remote client interface.
Access instructions

The TSM Console is installed by default with the TSM server for Windows NT® and 2000. For Windows NT, required MMC runtimes are provided. When the console is installed, a shortcut icon is placed on the desktop.

To start the TSM Console, double-click the desktop icon.

Note: For Windows 2000, the TSM Console snap-in can also be added to custom MMC consoles. The TSM console appears in the MMC Add/Remove Snap-in list.
Configuration and Management Wizards

The TSM Console includes a set of wizards that help you configure and manage your TSM server. One or more of these wizards is presented each time you add a new server instance, to guide you through the initial configuration process. You can return to individual wizards after the initial configuration to update settings and perform other management tasks. Two wizard-based configuration paths are available:

- **Standard configuration**
  - Does not configure all available TSM features, but it does produce a functional system that can be further customized and tuned.

- **Minimal configuration**
  - Quickly initializes a TSM server instance, to help you evaluate basic product function.

In either case, wizards help simplify the configuration process by hiding some of the details. For more information about configuration options, refer to "Chapter 4. Configuring Tivoli Storage Manager" on page 33.

**Recommended Use**

The TSM wizards are intended to be used for initial product configuration and can also be used to perform some ongoing management tasks. The wizards provide comprehensive online help, and are well-suited for use by administrators with limited TSM experience. Configuration and administration tasks supported by the wizards can also be performed using the administrative command line or web-based interfaces, which support the full range of TSM server function.

TSM wizards sometimes provide the most efficient interface, particularly for the following administrative tasks:

- License Configuration
- Service Configuration
• Device Configuration
• Media Labeling (and check-in)
• Volume Formatting

Access instructions
To start the initial configuration wizard sequence, do the following:
1. Start the TSM Console and expand the tree until the local machine name is displayed.
2. Right-click the local machine name and select Add a New TSM Server.
   The Initial Configuration Task List is displayed.
3. Select Standard configuration or Minimal configuration and click Start.

After you add and initially configure a new TSM server, you can access the complete set of wizards for that server instance by doing the following:
1. Start the TSM Console and expand the tree until the TSM server you want to work with is displayed.
2. Expand the TSM server tree and select Wizards.
   The wizard list is displayed in the right console pane.
The TSM administrative Web interface is a web-based graphical interface that provides comprehensive control of TSM server functions. This interface is automatically installed with the TSM server package and configured to manage the local server instance by default. The administrative Web interface and server command line provide duplicate function.

The TSM server package includes a Secure Web Administrator Proxy component that can be installed on a dedicated web server and used to improve the performance of the administrative Web interface. Refer to “Appendix E. Setting Up the Secure Web Administrator Proxy” on page 105 for more information.

Recommended Use
The administrative Web interface is intended as the primary tool for ongoing TSM server administration.

Access instructions
To access the administrative Web interface from the TSM Console, do the following:
1. Expand the tree for the TSM server you are administering and click Web Administration.
   The Administrator Login dialog appears in the right pane.
2. Enter an administrator name and password. The default name and password are both admin. Refer to “Changing Administrator Passwords” on page 77 to modify these values.

Note: You can also start the administrative Web interface from an external Web browser. From the browser, enter the URL for the TSM server in the following format:
   http://server_network_name:port_number
Server Command Line

The TSM server command line is a character-based interface that provides comprehensive control of TSM server functions. This interface is automatically installed with the TSM server package and configured to manage the local server instance by default. The server command line and administrative Web interface provide duplicate function.

**Recommended Use**

The server command line interface is useful for experienced TSM administrators who are familiar with the TSM command set. Some administrators rely on the TSM command line interface as their primary configuration and management tool. This interface allows for the generation of administrative scripts and macros, which can be scheduled to execute automatically.

**Access instructions**

To access the server command line from the TSM Console, do the following:

1. Expand the tree for the TSM server you are administering, expand **Reports**, and select **Command Line**.
   
   The **Command Line** view appears in the right pane.

2. Click **Command Line Prompt**.
   
   The command line interface appears.
The console monitor displays TSM system activity and requests for operator intervention. Once started, the console monitor only remains active as long as you are logged on to the current Windows desktop session. Administrative commands cannot be issued directly from the console monitor interface. You can issue TSM commands using the server command line provided by the TSM Console. A Net Send notification feature can be enabled to automatically send selected TSM status and request messages to a network computer while the console monitor is active.

**Recommended Use**

The console monitor provided by the TSM Console supports the server command line. If you issue commands from the command line interface, you can use the console monitor to view resulting TSM messages, status, and media mount or reply requests.

**Access instructions**

To access the console monitor from the TSM Console, do the following:

1. Expand the tree for the TSM server you are administering, expand Reports, and select Monitor.
   
   The Monitor view appears in the right pane.
2. Click Start.

To enable automatic Net Send notification of TSM status and request messages, do the following:

1. Start the console monitor.
2. From the Monitor view, click Properties.
   
   The Organize TSM Computers dialog appears. The Console Monitor tabbed page is displayed by default.
3. Ensure that Enable Net Send Notification is checked, select the network computer to be notified, and add message IDs for the messages that will be sent to that computer.
TSM Client Interfaces

The following interfaces can be accessed from a machine on which the TSM client is installed. The Web backup-archive client interface is intended to be accessed remotely.

Client Graphical Interface

![TSM Client Graphical Interface](image)

**Figure 3. TSM Client Graphical Interface**

The TSM client graphical interface is designed to allow end users to perform on-demand backup, archive, and recovery operations from the client machine. This interface uses the familiar Windows-style tree view to display drives, directories, and files that can be backed up or archived from the client machine and recovered from server storage.

Client administrative utilities can also be accessed from this interface, and wizards are provided to help configure the client options file, Web-based client interface, and scheduler service.

**Recommended Use**

The client graphical interface is intended as the primary end user interface for manually performing backup, archive, and recovery operations from the TSM client machine.

**Access instructions**

Refer to *Backup-Archive Installation and User’s Guide* for detailed installation, configuration, and access instructions.

To start the Windows client graphical interface, double-click the TSM Backup Client desktop icon.
Client Command Line

The TSM client command line is a character-based interface that provides comprehensive control of TSM client functions. This interface is automatically installed with the TSM client package.

**Recommended Use**

The client command line interface is useful for end-users who are familiar with the TSM client command set. This interface also allows for the generation of scripts, which can be used to automate client operations.

**Access instructions**

Refer to *Backup-Archive Installation and User’s Guide* for detailed installation, configuration, and access instructions. To access the Windows client command line, do the following:

1. Click **Start** | **Programs** | **Tivoli Storage Manager** and select **Backup Client Command Line**.
Web Backup-Archive Client

The TSM Web backup-archive client interface, also called the Web client, is a Java™-based graphical interface that provides extensive control of TSM client operations. This interface is included in the backup-archive client package, but must be manually installed and configured on each client node. After you install and configure this interface on a client node, you can use a supported Web browser to access that client. See "System Requirements" on page 27 for a list of supported browsers.

For centralized remote management, you can add the client node to the TSM Console tree and access the Web client interface from the console.

Recommended Use

The Web client interface supports most of the same client operations as the client graphical interface, but provides limited administrative function. Client node administrative utilities and configuration wizards cannot be accessed using this interface. The web interface can be used to remotely back up, archive, and restore client data. This function is particularly useful in a helpdesk-type environment.

Access instructions

Refer to Backup-Archive Installation and User’s Guide for installation and configuration instructions. To access the Web client interface from the TSM Console, do the following:

1. Add the machine on which the Web client has been installed and configured to the TSM Console tree view.
   Refer to the TSM Console online help for instructions.
2. Expand the tree for the TSM client machine, expand TSM Web Client, and select Web Administration.

   Note: If the Web client interface does not appear, right-click Web Administration, select Properties, and ensure that the network

24 Tivoli Storage Manager for Windows: Quick Start
name and port number are correct for the TSM client machine. Also ensure that the client acceptor service is started on the TSM client machine.

To access the Web client interface using a supported Web browser, open the browser and enter the URL for the TSM client in the following format:
http://client_network_name:port_number

Note: You will be prompted to download and install Java Runtime Environment (JRE) 1.3.1 if it is not detected on the local machine.

Where to Go From Here

Refer to the following sections for resources that provide more information about TSM concepts, as well as the fundamentals of TSM planning and implementation:

- “Capacity Planning” on page 28
- “TSM Documentation” on page 29

Basic Storage Management Tasks

This publication is primarily intended to help you do the following:

1. Install and configure TSM.
2. Verify the initial configuration.
3. Set up client/server communications.
4. Get started with administrative tasks.

Additional information and instructions are also provided, including the following:

- Using administrative interfaces
- Setting up the Secure Web Administrator Proxy
- Setting up Active Directory
- Setting up clustering
- Performing a minimal configuration
- Performing a silent installation
- National language support
- Removing TSM

Advanced Storage Management Tasks

The Administrator’s Guide is intended to help you perform a wide range of customization and ongoing management tasks, including the following:

Storage area network implementation
You can configure TSM to allow multiple servers to share storage devices over a SAN. You can also configure TSM clients to use a SAN to directly access storage devices.

External media management
You can extend Tivoli Storage Manager storage device and media management function using an external media manager like Windows Removable Storage Manager.

Server and storage pool protection
You can:

- Mirror your database and recovery log
- Back up your database and storage pools
• Recover lost or damaged database and storage pool data
• Move files from one storage pool volume to another

Data management policy
You can provide clients on some platforms with hierarchical space management services (HSM). You can also extensively customize backup and archive functions.

Security
You can modify the password access requirements for TSM clients, as well as other password parameters. You can also assign different levels of administrator authority.

Server operations
You can monitor and control:
• Server processes
• Client sessions
• Activity log
• Accounting records
• Logging facilities used to monitor server activity

Network of servers
You can create a network of Tivoli Storage Manager servers that can:
• Share object definitions such as storage policies, administrators, and command scripts
• Store information in each other’s storage pools
• Route commands to one or more servers

To store data from clients more efficiently, you may find that having Tivoli Storage Manager servers located close to your clients is the best way to manage network bandwidth limitations. As a result, you may have servers at many locations. TSM provides functions to help you configure, manage, and monitor the servers connected to a network consistently and efficiently.

TSM provides a number of functions to help you manage a network of servers. You can:
• Maintain and distribute server configuration information such as policy from a single configuration manager to many managed servers
• Monitor many servers and clients from a single server
• Issue commands on one server to other servers and groups of servers
• Use the storage on one server for data from another server

Use of these functions requires licensing for the optional features, Enterprise Administration, Network, and Server-to-server virtual volumes.
Chapter 2. Before You Install Tivoli Storage Manager

This section describes the following:

- “What You Should Know First”
- “System Requirements”
- “Capacity Planning” on page 28
- “Installable Components” on page 28
- “Evaluation (Try and Buy) Product” on page 29
- “TSM Documentation” on page 29
- “Accessibility Features” on page 30
- “Language Support” on page 30
- “Migrating to Tivoli Storage Manager Version 5.1” on page 31

What You Should Know First

Before installing TSM, you should be familiar with:

- The Windows operating system running on the TSM server machine
- The operating systems running on any TSM client machines
- Storage devices that will be available to TSM
- Communication protocols installed on your client and server machines
- Any special system configurations you plan to use, such as Microsoft Active Directory or Microsoft Cluster Server (MSCS)

System Requirements

Table 9 describes the minimum system requirements for Tivoli Storage Manager Version 5.1.

Table 9. TSM minimum system requirements

<table>
<thead>
<tr>
<th>Operating System</th>
<th>One of the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Microsoft Windows NT Workstation 4.0, Service Pack 5 or higher</td>
</tr>
<tr>
<td></td>
<td>Microsoft Windows NT Server 4.0, Service Pack 5 or higher</td>
</tr>
<tr>
<td></td>
<td>Microsoft Windows 2000 Server, Advanced Server, or Datacenter Server</td>
</tr>
<tr>
<td></td>
<td>Microsoft Windows XP Professional</td>
</tr>
</tbody>
</table>

| Web Browser       | To use the TSM console, Microsoft Internet Explorer Version 5 or higher is required, but it does not have to be your default browser. |
|-------------------| To use the TSM Web-based interfaces, a Java Swing-capable browser with Java Runtime Environment (JRE) 1.3.1 is required. Browsers that meet these requirements include: |
|                   | • Microsoft Internet Explorer 5.0 or later with JRE 1.3.1 installed. |
|                   | • Netscape Navigator 4.7 or later with JRE 1.3.1 installed |
|                   | • Netscape Navigator 6.0 or later |
|                   | If your browser meets these requirements but does not correctly display a TSM Web-based interface, consider trying a different browser. |
Table 9. TSM minimum system requirements (continued)

<table>
<thead>
<tr>
<th>Machine</th>
<th>Intel Pentium® compatible processor or multi-processor based computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disk Space</td>
<td>At least 110MB of free disk storage (for a typical installation)</td>
</tr>
<tr>
<td>Memory</td>
<td>128 MB (256 MB is recommended)</td>
</tr>
<tr>
<td>Communication Protocol</td>
<td>At least one of the following (installed by default with the current Windows operating systems):</td>
</tr>
<tr>
<td></td>
<td>• Named Pipes</td>
</tr>
<tr>
<td></td>
<td>• TCP/IP</td>
</tr>
</tbody>
</table>

Capacity Planning

Planning for TSM includes determining the number of client nodes to be managed by the TSM server, the backup and recovery needs of those clients, and the number and general size of client data files. There are other factors that should also be considered.

IBM publishes a useful guide called *Getting Started with Tivoli Storage Manager: Implementation Guide* (SG24-5416-01). This publication, which provides planning worksheets, instructions, and sample administrative macros and scripts, is available from the IBM Redbooks website at [http://www.redbooks.ibm.com/redbooks](http://www.redbooks.ibm.com/redbooks).

Installable Components

The TSM Server CD browser allows you to install the following components on the TSM server machine:

- TSM server
- TSM licenses
- TSM backup-archive client
- TSM device driver
- TSM open database connectivity (ODBC) driver

Table 10 describes these components.

Table 10. TSM installable components

<table>
<thead>
<tr>
<th>TSM Component:</th>
<th>Description:</th>
<th>Additional Information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Server (REQUIRED)</td>
<td>Includes the TSM database and tools to help you configure and manage TSM.</td>
<td>Refer to &quot;TSM Server Overview&quot; on page 3.</td>
</tr>
<tr>
<td>Licenses (REQUIRED)</td>
<td>Includes support for all TSM licensed features. After you install this package, you must apply the licenses you have purchased.</td>
<td>Refer to the chapter on managing server operations in the Administrator’s Guide (See &quot;TSM Documentation&quot; on page 29 to access this publication.)</td>
</tr>
</tbody>
</table>
Table 10. TSM installable components (continued)

<table>
<thead>
<tr>
<th>TSM Component:</th>
<th>Description:</th>
<th>Additional Information:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Device Driver</td>
<td>The TSM device driver extends TSM media management capability.</td>
<td>The TSM device driver is generally preferred for use with TSM. It is required for use with automated library devices and optical disk devices, unless you are using Windows Removable Storage Manager to manage media. Refer to the chapter on adding devices in the Administrator’s Guide. A list of devices supported by this driver is available from the TSM website.</td>
</tr>
<tr>
<td>Backup-Archive Client</td>
<td>Backup-archive client code transfers data to, and receives data from, the TSM server component.</td>
<td>Even if you are not planning to use TSM to back up the local machine, installing the client code locally assists in validating your server configuration. Refers to “TSM Client Overview” on page 3.</td>
</tr>
<tr>
<td>ODBC Driver</td>
<td>Provides an interface that reporting applications can use to access the TSM database.</td>
<td>For configuration instructions, refer to the documentation for your reporting application.</td>
</tr>
</tbody>
</table>

Evaluation (Try and Buy) Product

A 60-day evaluation (try and buy) version of Tivoli Storage Manager is available on CD-ROM via internal order. The try and buy version provides the same features as the standard licensed product. However, the license package is not included, and you are limited to 50 clients.

The installation instructions provided in “Chapter 3. Installing Tivoli Storage Manager” on page 33 apply to both the standard licensed product and the CD-ROM try and buy product.

Note: You can apply maintenance to a try and buy version of Tivoli Storage Manager.

To upgrade the try and buy version, install the license package from the standard licensed product CD. Refer to “Installing TSM Licenses (Required)” on page 33. After installing the license package, apply the licenses you have purchased.

TSM Documentation

The following resources are available to help you install, configure, and manage your TSM system:

Publications

The complete TSM product package includes a CD-ROM containing client and server publications, as well as hardcopy versions of Quick Start manuals.

Windows server and client publications can also be accessed using the Online Information reference tool. This tool allows you to search for information across these publications. Instructions for performing common tasks and troubleshooting tips are provided under the Questions and Answers heading.
To access the Online Information reference tool, right-click Tivoli Storage Manager in the TSM Console tree and select View TSM Online Information.

Refer to “Appendix G. Where to Look for Information” on page 123 for further resources, including a complete list of TSM publications.

Online Help
The TSM Console and wizards provide extensive online help. Conceptual overviews, task instructions, and detailed context-sensitive help are available.

Accessibility Features

Accessibility features help a user who has a physical disability, such as restricted mobility or limited vision, to use software products successfully. These are the major accessibility features of Tivoli Storage Manager:

- Server and client command line interfaces provide comprehensive control of TSM via a keyboard.
- The Windows client graphical interface can be navigated and operated using a keyboard.
- The Web backup-archive client interface is fully HTML 4.0 compliant and accessibility is limited only by the choice of Internet browser.
- All user documentation is provided in HTML and PDF format. Descriptive text is provided for all documentation images.
- The TSM Console follows Microsoft conventions for all keyboard navigation and access. Drag and Drop support is handled using the Microsoft Windows 2000 Accessibility option known as MouseKeys. For more information about MouseKeys and other Windows 2000 accessibility options please refer to the Windows 2000 Online Help (keyword: MouseKeys).

Language Support

American English is the default language for TSM server interface controls, console messages, and other text-based elements. Support for other languages is available, and is installed automatically, depending on the following:

If a Windows language version other than American English is enabled on the TSM server machine

Support for the other language will be automatically installed with the TSM server along with support for American English. If you want to install support for any additional languages, refer to “Installing the TSM Server” on page 33.

If a Windows language version other than American English IS NOT enabled on the TSM server machine

Only support for American English will be automatically installed with the TSM server. If you want to install support for any additional languages, refer to “Installing the TSM Server” on page 33.

TSM Console Language Support

The TSM server utilities have been replaced by a Microsoft Management Console (MMC) snap-in that allows you to manage TSM Windows and non-Windows resources across your network. To use the TSM management console with Windows NT 4.0, the Version 1.2 or higher MMC package must be installed. TSM includes only the American English version of the MMC package, which is installed automatically with the TSM server. To
enable other language support for the TSM Console, you must install the appropriate language version of MMC.

Migrating to Tivoli Storage Manager Version 5.1

When Tivoli Storage Manager Version 5.1 is started over a database that was written by ADSM or a previous version of TSM, the database is automatically upgraded. If you are migrating to TSM Version 5.1, consider doing the following:

- Set up a Tivoli Storage Manager Version 5.1 server on a non-production machine. This provides a way to test new function before upgrading your production database.
- Perform a full database backup. See the Administrator’s Guide for details. Also save a copy of the volume history and device configuration files. For additional information, see the BACKUP VOLHISTORY and BACKUP DEVCONFIG commands in the Administrator’s Reference.

Note: You cannot restore a prior version’s backed up database onto the latest version of TSM Server. For instance, you cannot restore a TSM 4.2 database onto TSM 5.1 server. For instructions on how to roll back to a prior version of the TSM server see “Removing the Tivoli Storage Manager Server” on page 71.

Device Support

Before migrating your TSM server, ensure that the new server provides support for your current storage devices. Refer to the Device Support section of the TSM Web site at http://www.tivoli.com/support/storage_mgr/tivolimain.html

To migrate from TSM 4.2.x.x

Install the new version and accept the default path, which will point to the existing server location. The setup program will automatically upgrade your TSM database and administrative Web interface.

To migrate from TSM 4.1.x.x

1. Write down the directory path of your current TSM server.
2. Use the Windows Add/Remove Programs dialog to uninstall the current TSM server.
3. Install the new TSM server to the same location as the original. The setup program will automatically upgrade your TSM database and administrative Web interface.

To migrate from TSM 3.7.x.x or ADSM 3.1.x.x

1. Write down the directory path of your current TSM server.
2. Use the Windows Add/Remove Programs dialog to uninstall the current TSM server.
3. Install the new TSM server to the same location as the original. After you complete the installation, the Initial Configuration Task List dialog will appear. Close this dialog.
4. Update and run the script tsmfixup.cmd, located in the console directory. (Refer to the script header for update instructions.) The script will automatically upgrade your TSM database and administrative Web interface.
If you are migrating from ADSM and have created a disaster recovery plan file using Disaster Recovery Manager (DRM), be aware that TSM does not use the same default installation directories as ADSM. Disaster recovery installation path references may no longer be valid.

After you have migrated to TSM, you should back up your storage pools and database and create a new disaster recovery plan file. For the sequence and details of the procedure, refer to the Administrator’s Guide.

If, after installing Tivoli Storage Manager Version 5.1, you wish to return to ADSM or a previous version of TSM, refer to “Removing the Tivoli Storage Manager Server” on page 71 for instructions.
Chapter 3. Installing Tivoli Storage Manager

Installing Tivoli Storage Manager consists of the following tasks:
1. Installing the TSM server and related components on the server machine.
2. Installing TSM client code on every machine that will transfer data to TSM server-managed storage.

This chapter provides instructions for installing the Tivoli Storage Manager server and related components.

Tivoli Storage Manager client code for UNIX and desktop clients is available on separate CD-ROMs included in the product package. The client code can also be installed from the server CD browser. For detailed TSM client installation and configuration instructions, see Backup-Archive Installation and User’s Guide.

TSM server maintenance releases, client software, and publications are also available from the TSM Web site at http://www.ibm.com/support/storage_mgr/tivolimain.html.

Tivoli Storage Manager Installation Steps

Installable TSM components include the following:
- TSM server
- TSM licenses
- TSM backup-archive client
- TSM device driver

You can also install the optional TSM ODBC driver, which allows reporting applications to export data from the TSM database.

See "Installable Components" on page 28 for component descriptions and installation recommendations. Before starting the installation procedure, ensure that you are logged on to Windows with a user name having administrator authority.

Note: TSM provides a minimal configuration option, which includes a quick-installation procedure. Refer to "Appendix A. Performing a Minimal Configuration" on page 79 for more information.

Installing the TSM Server

Note: If you intend to configure Tivoli Storage Manager in a Windows server cluster, see "Appendix D. Setting Up Clustering" on page 99 before you install the TSM server on the cluster node machines.

To install the TSM server, do the following:
1. Insert the TSM Windows Server CD-ROM.
   The TSM Server CD browser appears.
Click View Release Notes to open the “readme” file for this TSM release. This file contains the most current product information, including any installation or configuration instructions not covered by TSM publications.

2. Click Install Products.
   The Install Products dialog appears. See “Installable Components” on page 28 for component descriptions and installation recommendations.

3. Click TSM Server.
   The Choose Setup Language dialog appears.

4. Accept the default or select a language for the TSM installation dialogs and click OK.

   Note: This selection only specifies a language for the TSM installation dialogs. Full product language support can be specified by selecting the Custom installation option later in this installation sequence.

The Tivoli Storage Manager Server InstallShield Wizard appears.

5. Click Next.
   The Location to Save Files dialog appears.

6. Accept the default path or select a location for TSM files and click Next.
   The Setup Type dialog appears.

7. Select Typical or Custom and click Next.
Note: Custom installation allows you to select product language support and
deselect other TSM components. Refer to “Language Support” on page 30 for more information.

If you select Typical: The Ready to Install the Program window appears.

If you select Custom: The Custom Setup tree-view dialog appears. Do the following to select the language support you want to install with the TSM server (support for American English is installed by default):

a. Expand TSM Server and expand TSM Languages Support.
b. Select an available language and select This feature will be installed on local hard drive from the pop-up menu.
c. Click Next to continue the installation.

The Ready to Install the Program window appears.

8. Click Install.

A progress indicator appears. After the installation completes, the InstallShield Wizard Completed dialog appears.

9. Click Finish.

A dialog prompting you to restart your computer might appear. If you are not prompted, no restart is required.

Note: If you plan to install any other TSM components locally, return to the CD browser Install Products panel to complete those installations. See “Installable Components” on page 28 for component descriptions and installation recommendations. Installation instructions for the remaining TSM components are provided in the following sections:

- “Installing TSM Licenses (Required)”
- “Installing the TSM Backup-Archive Client Locally (Recommended)” on page 36
- “Installing the TSM Device Driver (Recommended)” on page 36

Installing Multiple TSM Servers on a Single Machine

In most cases, only one TSM server instance is required on the TSM server machine. You might want to install a second instance if you are configuring in a cluster. You might also want to run more than one server on a large machine if you have multiple tape libraries or a disk-only configuration. After you install and configure the first TSM server, use the Server Initialization wizard to create additional TSM server instances on the same machine (see “Server Initialization Wizard” on page 47 for details).

Installing TSM Licenses (Required)

See “Installable Components” on page 28 for a description of the TSM license package. To install the TSM license package from the CD browser Install Products dialog, do the following:

1. Click TSM Server Licenses.

   The Choose Setup Language dialog appears.

2. Accept the default or select a language for the TSM license installation dialogs and click OK.

   The Tivoli Storage Manager Licenses InstallShield Wizard appears.

Note: This selection only specifies the language of the TSM installation dialogs and has no effect on product language support.
3. Click Next.
   The Destination Folder dialog appears.
4. Accept the default path or select a location for TSM license files and click Next.
   The Setup Type dialog appears.
5. Select Complete or Custom and click Next.
   The Ready to Install the Program window appears.
6. Click Install.
   A progress indicator appears. After the installation completes, the InstallShield Wizard Completed dialog appears.
7. Click Finish.

Installing the TSM Backup-Archive Client Locally (Recommended)

It is recommended that you install the TSM backup-archive client on the TSM server machine to help you validate your server configuration. See Installable Components on page 28 for a description of the TSM backup-archive client. To install the backup-archive client from the CD browser Install Products dialog, do the following:
1. Click TSM Backup-archive Client.
   The Choose Setup Language dialog appears.
2. Accept the default or select a language for the TSM license installation dialogs and click OK.
   The Tivoli Storage Manager Client InstallShield Wizard appears.
3. Click the View Readme button to access the Readme or click Next to continue.
   The Destination Folder dialog appears.
4. Accept the default path or select a location for the client files and click Next.
   The Setup Type dialog appears.
5. Select Typical or Custom and click Next.
   The Ready to Install the Program dialog appears.
6. Click Install.
   A progress indicator appears. After the installation completes, the InstallShield Wizard Completed dialog appears.
7. Click Finish.

Refer to Backup-Archive Installation and User’s Guide for detailed installation and configuration instructions.

Installing the TSM Device Driver (Recommended)

See Installable Components on page 28 for a description of the TSM device driver. To install the TSM device driver from the CD browser Install Products dialog, do the following:
1. Click TSM Device Driver.
   The Choose Setup Language dialog appears.
2. Accept the default or select a language for the TSM device driver installation dialogs and click OK.
   The Tivoli Storage Manager Device Driver InstallShield Wizard appears.

Note: This selection only specifies the language of the TSM installation dialogs and has no effect on product language support.
3. Click Next.
   The Destination Folder dialog appears.
4. Accept the default path or select a location for TSM device driver files and click Next.
   The Setup Type dialog appears.
5. Select Typical or Custom and click Next.
   The Ready to Install the Program window appears.
6. Click Install.
   A progress indicator appears. After the installation completes, the InstallShield Wizard Completed dialog appears.
7. Click Finish.
   A dialog prompting you to restart your computer appears.

   **Note:** If you plan to install any other TSM components locally, return to the CD browser Install Products panel to complete those installations before restarting your computer.

   If you do not plan to install any other TSM components locally at this time, click YES to immediately restart your computer.

After installing Tivoli Storage Manager, see “Chapter 4. Configuring Tivoli Storage Manager” on page 39.
Chapter 4. Configuring Tivoli Storage Manager

The Tivoli Storage Manager for Windows server provides a graphical interface called the TSM Console, which includes a set of wizards that help you configure and manage your TSM system. One or more of these wizards is presented each time you add a new TSM server instance. You can choose from two wizard-based configuration paths:

**Standard configuration**
Choose this option to initialize and configure a server. A series of wizards is presented in sequence to guide you through the initial configuration process. This is the recommended configuration path for setting up a functional production environment.

**Minimal configuration**
Choose this option to quickly initialize a TSM server instance and perform a test backup of data located on the TSM server machine. This configuration allows you to quickly evaluate basic function.

While all TSM configuration and management tasks can also be performed using the command-line interface, the wizards are the preferred method for initial configuration. You can return to individual wizards after the initial configuration to update settings and perform management tasks. Refer to “Configuration and Management Wizards” on page 17 for more information.

This chapter contains an overview of the wizard-based initial configuration process and instructions for performing the initial configuration.

**Overview of Initial Configuration**

This section provides overview information for both standard and minimal configuration options.

**Standard Configuration**

During the standard configuration process, wizards help you perform the following commonly-required tasks:
- Analyze drive performance to determine best location for TSM server components
- Initialize the TSM server
- Apply TSM licenses
- Configure TSM to access storage devices
- Prepare media for use with TSM
- Register TSM client nodes
- Define schedules to automate TSM client tasks

Additional configuration wizards can help you perform the following optional tasks:
- Configure TSM for use in a Microsoft Cluster Server (MSCS) environment (Refer to “Appendix D. Setting Up Clustering” on page 99.)
- Configure TSM for use in a Windows 2000 Active Directory environment (Refer to “Appendix C. Setting Up Active Directory” on page 93)
Create a remote TSM for Windows client configuration package (Refer to "Installing Clients Using Shared Resources" on page 72.)

The standard initial configuration process does not include all Tivoli Storage Manager features, but it does produce a functional TSM system that can be further customized and tuned. The default settings suggested by the wizards are appropriate for use in many cases.

**Minimal Configuration**

During the minimal configuration process, a wizard helps you initialize a TSM server instance. Open client registration is enabled, so TSM client nodes can automatically register themselves with the server. The following objects are also created on the server machine:

- A client options file
  
  If a TSM client is not installed locally, the required directory structure will be created. If a client options file already exists, it will be backed up before the new file is created. TCP/IP communication is enabled for the client and server.

- A File device
  
  A file device is drive space designated for use as a virtual storage device. Standard files are used to represent individual media volumes. Data is written to file volumes sequentially, as if they were tape volumes. When a new file volume is required, a 25MB file is automatically created. When file volumes are emptied, they are automatically deleted. Because the minimal configuration option does not provide for storage device configuration, default backup and archive storage pools are configured to send their data to the file device.

Although the wizards simplify the configuration process by hiding some of the detail, a certain amount of TSM knowledge is still required to create and maintain a typically complex storage management environment. If you are not familiar with Tivoli Storage Manager functions and concepts, you should refer to "Chapter 1. Introducing Tivoli Storage Manager" on page 1 before you begin.

**Configuring TSM Enterprise Administration**

The initial configuration process configures a single server. If you have purchased the Enterprise Administration feature and plan to configure a network of servers, you must perform additional tasks. For details, see the chapter on working with a network of servers in the Administrator’s Guide. (See "TSM Documentation" on page 29 to access this publication.)

**Stopping the Initial Configuration**

You can click **Cancel** to exit any wizard panel. A dialog will appear, asking if you want to mark the current wizard task as complete. You can click **Yes** to continue to the next wizard, or **No** to exit the initial configuration process. However, cancelling during initial configuration can produce unexpected results. The preferred method is to complete the entire wizard sequence, and then restart an individual wizard to make any configuration changes.
Performing the Initial Configuration

Note: If you intend to configure Tivoli Storage Manager for use in a Microsoft Cluster Server (MSCS) environment, there are certain tasks that you must complete before you begin the initial configuration of the TSM server. Refer to "Appendix D. Setting Up Clustering" on page 99 before continuing with this section.

After you have installed Tivoli Storage Manager, do the following:

1. Double click the TSM Management Console icon on the desktop.
   The TSM Console window opens.

   ![Figure 5. TSM Console – Welcome](image)

   **Figure 5. TSM Console – Welcome**

2. Expand the Tivoli Storage Manager tree in the left pane until the local machine name is displayed.
3. Right-click the local machine name and select Add a New TSM Server.
   The Initial Configuration Task List is displayed.
4. Select **Standard configuration** or **Minimal configuration** and click **Start**. For more information about configuration options, refer to “Overview of Initial Configuration” on page 39.

- If you selected **Standard configuration**, refer to “Initial Configuration Environment Wizard” on page 43 for instructions.
- If you selected **Minimal configuration**, refer to “Server Initialization Wizard” on page 47 for instructions.

**Note:** If a TSM server instance already exists on the local machine, you will be prompted to confirm that you want to create and configure a new server instance. Be careful to create only the server instances you require. In most cases, only one server instance is necessary.
Initial Configuration Environment Wizard

Configuration Tasks

The Initial Configuration Environment Wizard is the first wizard in the standard configuration sequence. This wizard consists of a Welcome page and a series of input pages that help you perform the following tasks:

First Input Page
Choose whether configuration tips are automatically displayed during the initial configuration process. This additional information can be helpful for new TSM users.

Second Input Page
Choose to configure TSM in a standalone or network environment. Table 11 describes these environments.

Table 11. Standalone vs. Network Environment

<table>
<thead>
<tr>
<th>TSM Environment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standalone</td>
<td>A TSM backup-archive client and TSM server are installed on the same machine to provide storage management for only that machine. <strong>There are no network-connected TSM clients.</strong> Client-server communication will be automatically configured.</td>
</tr>
<tr>
<td>Network</td>
<td>A TSM server is installed. The backup-archive client is optionally installed on the same machine. <strong>You are licensed to install network-connected TSM clients on remote machines.</strong> You must configure communications between the remote clients and the server.</td>
</tr>
</tbody>
</table>
Results
The information you provide in this wizard will be used to customize upcoming wizards to reflect your preferences and storage environment.
Performance Configuration Wizard

The Performance Configuration Environment Wizard consists of a Welcome page and a series of input pages that prompt you for the following input:

**First Input Page**
Estimate how many clients the TSM server will support and the typical size of files to be stored.

**Second Input Page**
TSM analyzes local drives to determine the best location for initial TSM server volumes.

**Results**
The information you provide in this wizard, along with the results of an automated analysis of local drives, will be used to determine the best location for three important TSM volumes. (The term *volume* is used here to refer to space allocated in server random access storage.) Table 12 provides an overview of these volumes.

<table>
<thead>
<tr>
<th>Volume</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Database</td>
<td>Stores information needed for server operations and information about client data that has been backed-up or archived.</td>
</tr>
<tr>
<td>Recovery Log</td>
<td>Stores information about pending database updates until they are committed.</td>
</tr>
<tr>
<td>Disk Storage Pool</td>
<td>Stores client data in server disk space. This data can be kept on the server or migrated to another storage resource.</td>
</tr>
</tbody>
</table>
Preferred locations for these TSM volumes will be displayed in the Server Initialization Wizard, which appears later in the initial configuration sequence. You can modify the volume locations and default sizes using that wizard.
Server Initialization Wizard

The Server Initialization Wizard is the only wizard that appears during the minimal configuration process. It also appears as part of the standard configuration wizard sequence. This wizard consists of a Welcome page and a series of input pages that help you perform the following tasks:

First Input Page
Choose a directory to store files unique to the TSM server instance you are currently configuring.

Second Input Page
Choose directories for initial database, recovery log, and disk storage pool volumes. The default locations shown are preferred, based on the results of the Performance Configuration Wizard analysis.

Choose whether to dynamically extend the size of the database and recovery log by adding volumes as necessary.

Third Input Page
Choose a logon account for the TSM server service, and choose whether the service is started manually or automatically.

Fourth Input Page
Choose a name and password for the TSM server. Some TSM features require a server password.

If a Microsoft cluster server is detected during the standard configuration process, you will be prompted to configure Tivoli Storage Manager for use in a clustered environment. Select Yes to start the Cluster Configuration Wizard. Before you set
up a cluster for use with TSM, you will need to do some planning and ensure that your hardware is supported. For a detailed overview and task instructions, refer to "Appendix D. Setting Up Clustering" on page 99.

**Note:** The minimal configuration process does not support cluster configuration.

**Results**

When you complete the Server Initialization Wizard, TSM does the following:

- Initializes the server database and recovery log.
- Creates the database, recovery log, and disk storage pool initial volumes.

Server Initialization Wizard default settings specify the following initial volume sizes (by default, additional volumes will be dynamically added to extend the database and recovery log as required):

- A 13MB database volume (db1.dsm). The database size is largely determined by the amount of client data managed by the server. As you add clients, the database size can increase.
- A 9MB recovery log volume (log1.dsm). The recovery log size depends on the database size, and will increase accordingly.
- A 4MB storage pool volume (data1.dsm).

- Creates two default schedules: DAILY_INCR and WEEKLY_INCR. You can use the Scheduling Wizard to work with these schedules or create others.
- Registers a local administrative client with the server. This client is used to provide access to the administrative Web interface and server command-line interface. The client is named admin, and its default password is admin. To ensure system security, it is recommended that you change this password.

Initialization results are recorded in the initserv.log file in the server directory. If you have problems starting the server after initialization, check this log file for error statements. If you contact technical support for help, you may be asked to provide this file.

**Minimal Configuration:** If you are performing a minimal configuration, refer to “Run a Test Backup” on page 8 for instructions about how to test backup and archive function.
License Wizard

Note: The License Wizard will not appear if you have not installed the TSM license package. The license package is a required TSM component. If the License Wizard does not appear, do the following:
1. Complete the configuration wizard sequence.
2. Restart the CD browser and install the license package.
3. Return to the TSM Console, expand the tree for the TSM server you are configuring, and click Wizards. Select License Configuration from the wizards displayed in the right pane and restart this wizard to register the licenses you have purchased.

Tivoli Storage Manager base license support consists of the following:
• One local backup-archive client
• An unlimited number of administrative clients
• Enterprise Administration support
• Server-to-server virtual volume support
• Network communication support

You can use the License Wizard to apply these licenses, as well as any additional TSM licenses you have purchased. If you are not sure which additional features you are licensed for, or how many users, check your TSM purchase invoice. If this information is unavailable, use the wizard to select and apply the minimum licensing you require, and then purchase any additional licensing later.

Note: Licensing terminology refers to client nodes as managed systems. A managed system is a client or server machine that will use TSM client code to transfer
data to the TSM server. Managed System for SAN includes LAN support, so only one managed system license is required for each client node.

If you migrated from ADSM, you are required to update your license information.

**Configuration Tasks**

The License Wizard consists of a Welcome page and one input page that helps you select and apply the license options you have purchased.

To use the License Wizard, do the following:

1. Select a license description.
2. Update the **Purchased** spin box.
3. Click **Apply**.
4. Repeat for other purchased licenses.

**Results**

The licensing information you provide is registered with the TSM server.
Device Configuration Wizard

The Device Configuration Wizard automatically detects storage devices attached to the TSM server. Use this wizard to select the devices you want to use with TSM, and to configure device sharing if required.

- The left wizard pane displays a tree-view of devices connected to the TSM server machine. TSM device names are used to identify devices. Libraries and drives can only be detected if your hardware supports this function.
- The right pane displays basic and detailed information about the device selected in the tree-view. If the device is a type that can be shared, the Sharing tab displays any TSM components that will share the device.

To define a device, select its check box. Any device with an open check box can be defined to the TSM server. A library check box that is partially filled indicates that some of the drives associated with that library have not been selected for use with TSM.

**Note:** A solid green check box indicates that the device has been previously defined to TSM. Previously defined devices cannot be manipulated or removed using the wizard. You can use the administrative Web interface or server command line to perform this task.

**Configuration Tasks**
The Device Configuration Wizard consists of a Welcome page and input pages that help you perform the following tasks:

Figure 11. Initial Configuration – Device Configuration Wizard

The Device Configuration Wizard automatically detects storage devices attached to the TSM server. Use this wizard to select the devices you want to use with TSM, and to configure device sharing if required.

- The left wizard pane displays a tree-view of devices connected to the TSM server machine. TSM device names are used to identify devices. Libraries and drives can only be detected if your hardware supports this function.
- The right pane displays basic and detailed information about the device selected in the tree-view. If the device is a type that can be shared, the Sharing tab displays any TSM components that will share the device.

To define a device, select its check box. Any device with an open check box can be defined to the TSM server. A library check box that is partially filled indicates that some of the drives associated with that library have not been selected for use with TSM.

**Note:** A solid green check box indicates that the device has been previously defined to TSM. Previously defined devices cannot be manipulated or removed using the wizard. You can use the administrative Web interface or server command line to perform this task.

**Configuration Tasks**
The Device Configuration Wizard consists of a Welcome page and input pages that help you perform the following tasks:
Select the storage devices you want to use with TSM and define them to TSM.

Manually associate drives with libraries, if required.

Specify SCSI element number order for manually associated drives.

Configure device sharing, if required.

Manually add virtual or undetected devices.

**Manually associating drives**

Any drive listed as Unknown must be manually associated with a library. For example, drives attached to a Fibre Channel Switch or a SAN cannot be automatically associated. TSM can determine that the library contains a certain number of drives but cannot acquire their element numbers or addresses. The correct names for these drives will appear at the bottom of the tree as standalone drives. Drag and drop the unknown drive on the correct library. To use a library with TSM, any of its drives displayed as Unknown must be replaced with a valid drive name.

**Note:** If you manually associate more than one drive with the same library, you must order the drives according to element number. If you do not arrange the drives correctly, TSM will not work as expected. To determine the element number for a drive, select the drive and click the Detailed tab in the right wizard pane. Use the element number lookup tool to determine the correct position of the drive. If your drive is not listed, refer to the manufacturer’s documentation.

**Setting up device sharing**

To set up device sharing, click the Sharing tab and click the Components button. The Device Sharing dialog is displayed. Follow the directions in this dialog.

**Adding virtual or undetected devices**

Click the New button to add File-type devices and drives or libraries accessed through an NDMP file server.

**Results**

The libraries and drives you define to TSM will be available to store data.
The Client Node Configuration Wizard allows you to add and register the client nodes that will back up data to the server instance you are currently configuring. The wizard also allows you to specify how the backup data for these clients will be stored, by associating client nodes with storage pools. See “Overview of Storage Pools” on page 54.

- The left pane displays two default TSM storage pools (DISKPOOL and BACKUPPOOL). If you used the Device Configuration Wizard to define any storage devices to TSM, storage pools associated with those devices were automatically generated, and will also be displayed here.
- The right pane displays client nodes associated with the storage pool selected in the left pane.

To register new client nodes, you must provide client node names and passwords. You can also change storage policy settings by adding or modifying policy domains. TSM storage policy determines how many copies of backed up files are maintained, and how long individual copies of files are retained in storage.

**Note:** You should consider using this wizard to register any remote client nodes now, even if you have not yet installed TSM client code on those machines. After you complete the initial server configuration, you can install the client code remotely and configure the client nodes to transfer data to this server. See “Installing Clients Using Shared Resources” on page 72 for more information.
Overview of Storage Pools
TSM uses a logical construct called a Storage Pool to represent storage resources. Different storage pools are used to route client data to different kinds of storage resources. Storage pools can be arranged in a hierarchy, with one pointing to another, to allow for migration of data from one type of storage to another. See “Arranging the Storage Pool Hierarchy” on page 57.

TSM provides a default storage pool named DISKPOOL, which represents random-access storage space on the hard drive of the TSM server machine. During server initialization, TSM created one volume (representing a discrete amount of allocated space) in this storage pool. By default, this volume was configured to grow dynamically. You can add more volumes to expand this storage pool as required.

TSM also provides three other default storage pools, which are all set up to point to DISKPOOL. These three storage pools correspond to the three ways TSM manages client data: backup, archive, and space-management. The Client Node Configuration Wizard allows you to work with the backup storage pool, BACKUPPOOL.

By default, data for any client nodes you associate with BACKUPPOOL will be immediately transferred to DISKPOOL. You can store the data in DISKPOOL indefinitely, or just use DISKPOOL as a temporary cache and then migrate the data to any other storage devices represented in the storage pool hierarchy.

For more information, and to configure additional storage pools, refer to the chapter on managing storage pools and volumes in the Administrator’s Guide. (See “TSM Documentation” on page 29 to access this publication.)

Configuration Tasks
The Client Node Configuration Wizard consists of a Welcome page and several input pages that help you perform the following tasks:
• Register client nodes with the TSM server. You can add nodes individually, or detect and register multiple clients at once.
• Define client/disk associations for use with TSM Server-free Data Movement.
• Associate registered nodes with storage pools by adding the clients to a new or existing policy domain.
• Arrange the storage pool hierarchy to meet your storage needs.

Registering Client Nodes: To register client nodes individually, do the following:
1. Click the Add button.
   The Properties dialog appears, with the Node information tab selected.
2. Enter the node name and password information.

3. Consider your storage policy needs.

   By default, the new client node will be associated with the STANDARD storage policy domain. BACKUPPOOL is the default backup storage pool for this domain. You can associate the new client node with a different storage pool by clicking **New** to create a new policy domain, or **Edit** to modify the existing policy domain.

   Managing multiple policy domains can significantly increase your administrative overhead, so you should create only the domains you require. For more information, refer to the chapter on implementing policies for client data in the Administrator’s Guide.

To detect and register multiple client nodes at once, return to the main wizard panel and click the **Advanced** button. Follow the instructions in the **Properties** dialog. You can add clients from a text file, or choose from computers detected in your Windows domain. The TSM console directory contains a file named `sample_import_nodes.txt`, which defines the format required to import client nodes.

To modify TSM client node information, select a client node name from the right wizard pane and click the **Edit** button. To delete a client node you just added, select the client node name and click the **Delete** button.

**Note:** You cannot use the wizard to delete a client that was previously defined to the server. You can use the administrative Web interface or server command line to perform this task.
Defining Client/Disk Associations: TSM can be configured for server-free data movement, which allows for full-volume backup and restore of client data stored on dedicated SAN-attached disk. If you are planning to use this feature, you must define the client/disk association to the TSM server. To define this association, do the following:

1. From the main wizard panel, click the Add button. The Properties dialog appears.
2. Click the SAN Disks tab. The Server Free Data Movement Disk Information page appears.

3. To manually add SAN disk information:
   a. Enter the name that uniquely identifies this SAN disk. The name must be entered using the format **harddiskX**, where X is the disk number defined to the client machine. You can use the MMC Disk Management snap-in to obtain this disk number from the client machine. Refer to the TSM online help for more information.
   b. Enter the serial number that identifies this disk on the SAN. The serial number can be obtained from the disk.
   c. Optionally enter a world wide name for the disk.
   d. Click the Add button. The disk will be added to the right pane, and will be associated with this client node when the wizard completes.
4. To quickly identify and add SAN disk information, click the **Detect** button and follow the instructions in the **Detect SAN Devices** dialog.

To modify SAN disk information, select the disk name in the right pane, update any fields, and click the **Update** button. To remove a SAN disk from the list, select the disk name in the right pane and click the **Remove** button.

**Note:** You cannot use the wizard to remove a disk that was previously associated with this client. You can use the administrative Web interface or server command line to perform this task.

**Arranging the Storage Pool Hierarchy:** By default, new client nodes will send backup data to BACKUPPOOL, which will immediately migrate the data to DISKPOOL. You can point BACKUPPOOL at any other displayed storage pool to route data there instead. A storage pool can migrate data to one other storage pool. Multiple storage pools can be set up to migrate data to the same storage pool. To see which clients are associated with a storage pool, select a storage pool in the left wizard pane. Any client nodes associated with that pool are displayed in the right pane.

**Note:** In a standalone server configuration, it is generally more efficient to back up data directly to tape. However, in a network configuration, consider arranging your storage pools so that client data is backed up to disk and later migrated to tape.

**To backup client data directly to tape:**
1. Associate clients with BACKUPPOOL.
2. Drop BACKUPPOOL on a tape storage pool (for example, 8MMPOOL1).

**To backup client data to disk, for migration to tape:**
1. Associate clients with BACKUPPOOL.
2. Drop BACKUPPOOL on DISKPOOL. (This is the default setting.)
3. Drop DISKPOOL on a tape storage pool.

**Results**
Client nodes you have registered can be configured to back up data to this TSM server instance. The backup data will be managed according to way you set up the client’s associated storage pool hierarchy.
Media Labeling Wizard

Storage media must be labeled and checked in to TSM before it can be used. Media labels are written at the start of each volume to uniquely identify that volume to TSM. The Media Labeling Wizard only appears if attached storage devices have been defined to TSM.

Slightly different versions of the wizard will appear for automated and manual storage devices. This section describes the media labeling and check-in process for automated library devices.

Configuration Tasks
The Media Labeling Wizard consists of a Welcome page and a series of input pages that help you perform the following tasks:

First Input Page
Select the devices that contain the media you want to label.

Second Input Page
Select and label specific media.

Third Input Page
Check in labeled media to TSM.

Selecting Devices and Drives:

The left pane displays devices and drives recognized by TSM.

The right pane displays information about any device or drive selected in the left pane.

Figure 15. Initial Configuration – Media Labeling Wizard (1)
To select a device and any associated drives, check the box next to the device or drive name.

Selecting and Labeling Media:

1. Check the box next to the media you want to label.
2. Check **Overwrite existing label** if necessary, and select from the other available labeling options.
3. Click the **Label Now** button.
   The **TSM Media Labeling** dialog appears.
4. Enter a label for the media.
   The Media Labeling Wizard supports labels up to six characters long.
5. Click **OK**.
   The **TSM Media Labeling Monitor** dialog appears. Status is displayed and updated throughout the labeling process. When the labeling process is complete, the **OK** button becomes active. The amount of time this takes can depend on the storage hardware and type of media you are using.
6. Click **OK**.
   The new label should appear in the left pane.
7. After you have finished labeling media, click **Next**.
   The **Media Check-in** dialog appears.

Figure 16. Initial Configuration – Media Labeling Wizard (2)
Checking in Media:

This dialog will only appear if you labeled media in the previous dialog.
- Click the **Check-in now** button to check in labeled media to TSM. Media volumes from all of the storage devices you selected in the first media labeling dialog are eligible for check-in. All labeled media not previously checked in to this server will automatically be checked in at this time.

A dialog appears, describing the check-in process. Check-in runs as a background process, and media will not be available for use until the process completes. Depending on your storage hardware, and the amount of media being checked in, this process can take some time. To monitor the check-in process, complete the initial configuration and do the following:
1. From the TSM Console, expand the tree for the TSM server you are configuring.
2. Expand **Reports** and click **Monitor**.
3. Click the **Start** button to monitor server processes in real time.

**Results**
When the check-in process has completed, media will be available for use by TSM. By default, media volumes will be checked in with **scratch** status. For more information, refer to the chapter on media management in the Administrator’s Guide. (See [TSM Documentation](#) on page 29 to access this publication.)
Where to go from here

After the Initial Configuration completes, you are prompted to verify your configuration. If you have installed a local backup-archive client, click Yes to immediately start the client. Click No if you have not installed the client code locally, or if you plan to verify your configuration by backing up remotely installed clients. See "Chapter 5. Verifying the Initial Configuration" on page 65 for verification instructions.

Note: Click the TSM Backup Client icon on your desktop to start the local backup-archive client at any time.

You can use the TSM Console to perform a variety of administrative tasks, including issuing commands and monitoring server processes. You can also access the individual wizards you used during the initial configuration process from this interface. Additional wizards are also available. Refer to "TSM Interfaces" on page 14 for information about the TSM Console and other administrative interfaces.

For detailed information about managing your TSM environment, refer to the Administrator’s Guide (See "TSM Documentation" on page 29 to access this publication.)

Default Configuration Results

The TSM configuration wizards simplify the setup process by hiding some of the detail. For the ongoing management of your TSM system, it can be helpful to understand what has been created for you.

Data Management Policy Objects

Table 13 on page 62 lists the default TSM data management policy objects. Refer to "Data Management Policy" on page 8 for an introduction to these objects. For more information, refer to the chapter on implementing policies for client data in the Administrator’s Guide.
Table 13. Default Data Management Policy Objects

<table>
<thead>
<tr>
<th>TSM Object</th>
<th>Name</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy Domain</td>
<td>STANDARD</td>
<td>By default, any clients or schedules you created were added to this domain. The domain contains one policy set.</td>
</tr>
<tr>
<td>Policy Set</td>
<td>STANDARD</td>
<td>This policy set is ACTIVE. It contains one management class.</td>
</tr>
<tr>
<td>Management Class</td>
<td>STANDARD</td>
<td>This management class contains a backup copy group and an archive copy group.</td>
</tr>
<tr>
<td>Copy Group</td>
<td>STANDARD</td>
<td>This copy group stores one active and one inactive version of existing files. The inactive version will be kept for 30 days. Stores one inactive version of deleted files for 60 days. Points to BACKUPPOOL.</td>
</tr>
<tr>
<td>Copy Group</td>
<td>STANDARD</td>
<td>This copy group stores one active and one inactive version of existing files. The inactive version will be kept for 30 days. Stores one inactive version of deleted files for 60 days. Points to ARCHIVEPOOL.</td>
</tr>
</tbody>
</table>

Storage Device and Media Policy Objects

Table 14 lists the default TSM storage device and media policy objects. Refer to "Storage Device and Media Management" on page 10 for an introduction to these objects. For more information, refer to the chapter on managing storage pools and volumes in the Administrator’s Guide.

Table 14. Default Storage Device and Media Policy Objects

<table>
<thead>
<tr>
<th>TSM Object</th>
<th>Name</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Storage Pool</td>
<td>BACKUPPOOL</td>
<td>This storage pool points to DISKPOOL. No volumes are defined, so data will migrate immediately. You might have used the Client Node Configuration Wizard to point BACKUPPOOL directly at a removable media device.</td>
</tr>
<tr>
<td>Storage Pool</td>
<td>ARCHIVEPOOL</td>
<td>This storage pool points to DISKPOOL. No volumes are defined, so data will migrate immediately.</td>
</tr>
<tr>
<td>Storage Pool</td>
<td>DISKPOOL</td>
<td>This storage pool consists of a 4MB volume created in the tsmdata directory. You might have used the Client Node Configuration Wizard to point DISKPOOL directly at a removable media device. If so, data will begin to migrate from DISKPOOL to the device when DISKPOOL reaches 90% of capacity. Migration will continue until DISKPOOL reaches 70% of capacity.</td>
</tr>
</tbody>
</table>

TSM library, drive, storage pool, and path objects will have been created for any storage libraries or drives you defined using the Device Configuration Wizard. TSM volumes will have been created for any media you labeled using the Media Labeling Wizard. If you used the Client Node Configuration Wizard to associate a TSM client with SAN-attached disk, a TSM disk object was also created.
### Server Components

Table 15 lists the default TSM server components. Refer to “TSM Server Overview” on page 2 for an introduction to these components. For more information, refer to the chapters on maintaining the server and managing the database and recovery log in the Administrator’s Guide.

**Table 15. Default Server Components**

<table>
<thead>
<tr>
<th>TSM Object</th>
<th>Name</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSM Server</td>
<td>Server1</td>
<td>By default, the server runs in background mode as a Windows service. The service is set to start automatically when Windows boots.</td>
</tr>
<tr>
<td>TSM Server Database</td>
<td>Initial volume is named db1.dsm.</td>
<td>The server database consists of one 13MB volume (12MB usable space) created in the ..\tsmdata\server1 directory. The SPACETRIGGER is set at 80% and EXPANSION at 100%, so when the volume reaches 80% of capacity, a new volume of the same size will be automatically created in the same directory. There is no maximum size specified for the database. The default maximum size is 500GB.</td>
</tr>
<tr>
<td>TSM Server Recovery Log</td>
<td>Initial volume is named log1.dsm.</td>
<td>The server recovery log consists of one 9MB volume (8MB usable space) created in the ..\tsmdata\server1 directory. The SPACETRIGGER is set at 80% and EXPANSION at 100%, so when the volume reaches 80% of capacity, a new volume of the same size will be automatically created in the same directory. There is no maximum size specified for the recovery log. The default maximum size is 5.5GB.</td>
</tr>
</tbody>
</table>

### Client Components

Table 16 lists the default TSM client components. Refer to “TSM Client Overview” on page 4 for an introduction to these components. For more information, refer to the chapters on managing and scheduling client operations in the Administrator’s Guide.

**Table 16. Default Client Components**

<table>
<thead>
<tr>
<th>TSM Object</th>
<th>Name</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSM Client (Local Administrative)</td>
<td>ADMIN</td>
<td>This client is registered with the TSM server by default. It provides access to the administrative Web interface and server command-line interface. The default password is ADMIN. To ensure system security, it is recommended that you change the password. During the standard configuration process, you are also prompted to create at least one local backup-archive client with the same name as the local machine.</td>
</tr>
</tbody>
</table>
### Table 16. Default Client Components (continued)

<table>
<thead>
<tr>
<th>TSM Object</th>
<th>Name</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client Schedule</td>
<td>DAILY_INCR</td>
<td>This schedule is defined in the STANDARD policy domain, so only clients associated with that domain can use it. You can use the Scheduling Wizard to associate clients with this schedule. You must also install and start the client scheduler service on each client node. The schedule runs a daily incremental backup at the same time you initially configured TSM. The schedule has a window of 2 hours, and a priority of 5.</td>
</tr>
<tr>
<td>(Weekly)</td>
<td>WEEKLY_INCR</td>
<td>This schedule is defined in the STANDARD policy domain, so only clients associated with that domain can use it. You can use the Scheduling Wizard to associate clients with this schedule. You must also install and start the client scheduler service on each client node. The schedule runs a weekly incremental backup every Friday at the same time you initially configured TSM. The schedule has a window of 1 hour, and a priority of 2.</td>
</tr>
</tbody>
</table>

Your environment might differ somewhat from the one described in this section, depending on the choices you made during the initial configuration process. All of these default settings can be modified, and new policy objects can be created. Refer to “Chapter 6. Getting Started with Administrative Tasks” on page 69 and the Administrator’s Guide for detailed instructions.
Chapter 5. Verifying the Initial Configuration

This chapter helps you verify the initial configuration by backing up client data to the Tivoli Storage Manager server. This chapter also includes these related tasks:

- "Backing up a Client"
- "Restoring Client Files or Directories" on page 66
- "Archiving and Retrieving Files" on page 67
- "Retrieving Archive Copies" on page 68

Before Backing up Remote Clients

Before you can back up a remote client, you need to do the following (these two tasks can be performed in any order):

- Register the client node with the TSM server (Refer to "Client Node Configuration Wizard" on page 53).
- Install and configure the TSM client on each remote machine.

Installing the TSM client:

You can install the TSM client using any of the following methods:
- Install directly from the CD-ROM.
- Create client images to install.
- Use a network-shared drive to distribute the TSM client code. (Refer to "Installing and Configuring Clients" on page 73).

Configuring the TSM client:

Configure the communications options in the client options file to connect with the server.

Note: Each TSM client instance requires a client options file (dsm.opt). For the location and details about configuring the client options file, see "Creating or Updating a Client Options File" on page 74. You may also need to set up Tivoli Storage Manager schedules for your remote clients. See "Working with Schedules on Network Clients" on page 74 for more information.

Backing up a Client

This section describes a simple backup of client files. For more information, see the appropriate Using the Backup-Archive Clients User's Guide.

Note: We recommend that you back up a small file or directory.

Do the following to back up a remote or local client:

1. Start the client, enter a node name and password, and click Login. The backup-archive client window opens.
2. Click Backup from the client window. The Backup window opens.
3. Expand the directory tree.
4. Select the folder icons to display the files in the directory.
5. Click on the selection boxes next to the files or directories you want to back up.
6. From the drop-down list, choose the backup type:
Incremental (date only)
Incremental (complete)
Always backup: for a selective backup

Note: The first backup of a file is always a full backup, regardless of what you specify.

7. Click **Backup**. The Backup Report window displays the backup processing status.

Note: If you receive a message indicating that the server could not be contacted, see the Common Questions and Answers section of the Tivoli Storage Manager Online Information.

Excluding Files From the Backup

You may not want to back up certain files. These files may be core files, local caches of network file systems, operating system or application files that could be easily recovered by installing the program again, or any other files that you could easily rebuild. You can create an include-exclude list in the client options file to exclude certain files from both incremental and selective backup processing. Tivoli Storage Manager backs up any file that is not explicitly excluded from backup. You can also include specific files that are in a directory that you have excluded. For more information, see the appropriate **Using the Backup-Archive Clients User’s Guide**.

Restoring Client Files or Directories

This section describes a simple restore of client files. For details and advanced procedures, see the appropriate **Backup-Archive Installation and User’s Guide** publication.

To restore backup versions of files or directories, do the following:
1. Click **Restore** from the client window. The **Restore** window opens.
2. Expand the directory tree.
3. Expand the **File Level**.
4. Click on the selection boxes next to the files or directories you want to restore.
5. Click **Restore**. The **Restore Destination** window opens.
6. Select the destination in the **Restore Destination** window.
7. Click **Restore**. The **Restore Report** window displays the restore processing status.
Tivoli Storage Manager can keep multiple versions of files, and you can choose which version to restore. TSM marks the most recent version as active and all other versions as inactive. When you back up a file, TSM marks the new backup version active, and marks the previous active version as inactive. When the maximum number of inactive versions is reached, TSM deletes the oldest inactive version.

If you try to restore both an active and inactive version of a file at the same time, only the active version is restored.

- To restore an active backup version, click Display active files only from the View drop-down list.
- To restore an inactive backup version, click Display active/inactive files from the View drop-down list.

For more information, see the appropriate Using the Backup-Archive Clients User’s Guide.

---

**Archiving and Retrieving Files**

This section describes a simple archive and retrieval of client files. For more information, see the appropriate Using the Backup-Archive Clients manual.

We recommend that you archive a small file or directory. You can select files to be archived by name or from a directory tree.

**Archiving Files by Name**

To archive files by name, do the following:

1. Click the Archive button in the client main window. The Archive window opens.
2. Expand the directory tree until you find the drive or directory that you want.
3. Highlight the drive or directory that you want.
4. Search for file names by doing the following:
   a. Click the Find button on the tool bar.
   b. Enter the search criteria in the Find Files window. You can use a mask to find files with similar names. Assign a unique description for each archive package.
   c. Click Search. The Matching Files window opens.
5. Click the selection boxes next to the files you want to archive.
6. In the Description box on the tool bar, enter a description, accept the default description, or select an existing description for your archive package
7. Click Archive to archive the files. The Archive Status window displays the status progress of the archive.

**Archiving Files Using a Directory Tree**

You can archive specific files or entire directories from a directory tree. To archive your files from the directory tree, do the following:

1. Click the Archive button in the client main window. The Archive window opens.
2. Expand the directory tree until you find the directories or drive that you want.
3. Click the selection boxes next to the files or directories that you want to archive.
4. In the Description box on the tool bar, enter a description, accept the default description, or select an existing description for your archive package.
5. Click Archive. The Archive Status window opens. The Archive Report window displays the status progress of the archive.

Retrieving Archive Copies
You retrieve files when you want to return archived copies of files or directories to your workstation. To retrieve archived copies, do the following:
1. Click the Retrieve button on the client main window. The Retrieve window opens.
2. You can find the files or directories in either of the following ways:
   - From the directory tree: Expand the directory tree until you find the object you want. The objects are grouped by archive package description.
   - By name:
     a. Click the Find icon on the tool bar. The Find Files window opens.
     b. Enter your search information in the Find Files window.
     c. Click Search. The Matching Files window opens.
3. Click on the selection boxes next to the objects that you want to retrieve.
5. Enter the information in the Retrieve Destination window.
6. Click Retrieve. The Retrieve Report window displays the processing results.

Where to go from here
To customize Tivoli Storage Manager, go to “Chapter 6. Getting Started with Administrative Tasks” on page 69.
Chapter 6. Getting Started with Administrative Tasks

This chapter provides an introduction to some basic Tivoli Storage Manager administrative tasks. Refer to the Administrator’s Guide for a comprehensive discussion of TSM features and detailed instructions on monitoring, customizing, and administering the TSM environment. This chapter describes the following administrative tasks:

Managing the TSM server
- Using TSM Administrative Interfaces
- Starting the TSM Server
- Stopping the TSM Server on page 70
- Backing up the TSM Server Database and Database Recovery Log on page 70
- Removing the Tivoli Storage Manager Server on page 71

Installing and configuring TSM clients
- Installing and Configuring Clients on page 73
- Creating or Updating a Client Options File on page 74

Managing TSM client schedules
- Starting the Tivoli Storage Manager Scheduler on page 74
- Verifying a Schedule on page 74

Managing TSM client/server communications
- Setting Client/Server Communications Options on page 75
- Configuring TSM Client/Server Communication Across a Firewall on page 76

Managing TSM administrators
- Registering Additional Administrators on page 77
- Changing Administrator Passwords on page 77

Managing the TSM Server

Using TSM Administrative Interfaces
For TSM server administrative interface overviews and access information, refer to TSM Interfaces on page 14. For detailed descriptions of TSM server administrative interfaces, refer to Appendix F. Using Administrative Interfaces on page 115.

Starting the TSM Server
You can start the Tivoli Storage Manager server in several ways. However, we recommend that you start it as a service. In this way, the server remains active when you log off the workstation. To start the server as a service, do the following from the TSM Console:

1. Expand the tree for the TSM server you are starting and expand Reports.

2. Click Service Information.
The Service Information view appears in the right pane.

3. If the server status displays Stopped, right click service line and select Start.

**Stopping the TSM Server**

You can stop the server without warning if required. To avoid losing administrative and client node connections, stop the server only after current sessions have been completed or canceled. For most tasks in this book, your server must be running. This procedure is explained here only if an unusual situation requires that you stop the server.

To stop the server, do one of the following:

- **Stop a server that is running as a Service:**
  1. Expand the tree for the TSM server you are stopping and expand Reports
  2. Click Service Information.
     The Service Information view appears in the right pane.
  3. Right-click the server service line and select Stop.

  **Note:** This shuts down the server immediately. The shutdown also cancels all TSM sessions.

- **Stop a server from the administrative Web interface:**
  1. From the tree view in the browser, expand Object View.
  2. Expand Server.
  3. Click Server Status.
  4. From the drop-down menu, select Halt Server and click Finish.

  **Note:** This procedure shuts down the server immediately. The shutdown also cancels all client sessions.

- **Stop a server from the administrative command line:**
  1. Expand the tree for the TSM server you are stopping and expand Reports
  2. Click Command Line.
     The Command Line view appears in the right pane.
  3. Click Command Line Prompt in the right pane.
     The Command Prompt dialog appears.
  4. Enter halt in the Command field, and click the Submit button.

  **Note:** This shuts down the server immediately. The shutdown also cancels all client sessions.

**Backing up the TSM Server Database and Database Recovery Log**

If the TSM server database or the recovery log is unusable, the entire server is unavailable. If a database is lost and cannot be recovered, all of the data managed by that server is lost. If a storage pool volume is lost and cannot be recovered, the data on the volume is also lost.

With Tivoli Storage Manager you can define administrative schedules so that the database and storage pools are backed up regularly. If you should lose your database or storage pool volumes, you can use offline utilities provided by Tivoli Storage Manager to restore your server and data.
See the Administrator's Guide for details.

Removing the Tivoli Storage Manager Server

This section describes what you need to do before removing the current version of the TSM server, and tells you how to rollback to a previous version of TSM (or ADSM).

After removing the Tivoli Storage Manager device driver, the system will require a reboot.

To return to ADSM or an earlier version of TSM, after a migrate install, you must have a full database backup from your original version and the server install code for your original version.

Note: You cannot restore a prior version’s backed up database onto a newer version of the TSM server. For instance, you cannot restore a TSM 3.7 database onto TSM 4.2 server.

Be aware of the results of returning to ADSM or an earlier version of TSM:
- References to client files that were backed up, archived, or migrated to the current TSM server will be lost.
- Some volumes may have been overwritten or deleted during TSM server operation. If so, client files that were on those volumes and that were migrated, reclaimed, moved (MOVE DATA command), or deleted (DELETE VOLUME command) may no longer be accessible to the earlier version of ADSM or TSM.
- Definitions, updates, and deletions of TSM objects performed on the current TSM server will be lost.

Before Removing Tivoli Storage Manager

You must do the following:

1. Do a full database backup. For example, if you have a tape device class named TAPECLASS, do a full backup by issuing the following command:

   `backup db type=full devclass=tapeclass`

2. Save a copy of the volume history and device configuration files that were defined in the server options file with the VOLHISTORY and DEVCONFIG options respectively. For example, to save the volume history in a file called VOLHIST and the device configuration in a file called DEVICES, enter:

   `backup volumehistory filenames=volhist
    backup devconfig filenames=devices`

3. Store the output volumes in a safe location.

Rollback to previous version of TSM (or ADSM)

You cannot restore a prior version’s backed up database onto a newer version of TSM server. For instance, you cannot restore a TSM 3.7 database onto TSM 4.2 server.

1. Stop the current Tivoli Storage Manager server if it is currently running, by entering the following command:

   `halt`
2. Remove the current TSM server software.
3. Reinstall the previous version of TSM and the most recent maintenance.
4. Define the Tivoli Storage Manager devices to the operating system.
5. Reinitialize any database and recovery log volumes, other than those created during install, using the DSMSERV FORMAT utility. See Administrator’s Reference for details.
6. Reload the TSM database using the DSMSERV RESTORE DB utility.
   ```
   dsmserv restore db todate=07/04/2000
   ```
   See TSM Administrator’s Reference for details.
7. Start the server by entering the following command:
   ```
   dsmserv
   ```
8. Issue an AUDIT VOLUME FIX=YES command for each sequential storage pool volume that has a volume type of STGDELETE or STGREUSE to audit all disk storage pool volumes.
   For every sequential volume specified in the volume history file with a volume type of STGREUSE or STGDELETE, execute the AUDIT VOLUME FIX=YES command to clean up invalid database references to the volume(s).
   If you cannot locate a volume that has a volume type of STGDELETE, use the DELETE VOLUME DISCARDATA=YES command to remove references to the volume from the server database.

### Installing and Configuring TSM Clients

One way to install TSM clients is to run the setup routine manually on each network-attached client machine. Similarly, you can configure TSM clients by manually editing the client options file on each machine. To simplify the installation and configuration of multiple TSM clients, consider copying the client setup files from the product CD and using the Network Client Options File Wizard to create a configuration package. The setup files and configuration package can then be placed on a file server that can be accessed by Windows clients using a network-shared drive.

#### Installing Clients Using Shared Resources

This section describes how to place the Tivoli Storage Manager client program on a file server and how to use the package created by the Network Client Options File Wizard. In the example shown in Figure 19 on page 73, Tivoli Storage Manager is installed on a server named EARTH, which shares its D drive with all the Windows client machines.
Each client machine is configured so that when it boots up, it maps the EARTH D drive as its Z drive. For example, at start-up each client issues this command:

```
NET USE Z: \EARTH\D$
```

The administrator used the Network Client Options File Wizard to create a client configuration package named `earthtcp` that was stored on EARTH in the `d:\tsmshar` directory. The administrator then registered each client node ("Client Node Configuration Wizard" on page 53).

**Installing and Configuring Clients**

The following scenario describes how to install the remote client and configure it from a shared directory:

1. On EARTH, copy the contents of the Win32 client directory from the Tivoli Storage Manager client CD to the `d:\tsmshar` directory. Ensure that you include any client subdirectories. You can use Windows Explorer or the `xcopy` command with the `/s` option to perform the copy.

2. Provide the users of the Windows clients with the following instructions for installing the client from the shared directory:
   a. Open a command prompt and change directories to the shared CD-ROM drive on EARTH. For example:
      ```
      chdir /d x:\tsmshar
      ```
   b. Start the client installation:
      ```
      setup
      ```
      Follow the instructions in the setup routine.
   c. Run the configuration package batch file to configure the client to communicate with the server (that is, create the client options file) by issuing:
      ```
      earthtcp.bat
      ```

   **Note:** Using Windows Explorer, you can run the batch file if the drive is shared and if you start the file from the shared directory. However, you cannot run the batch file if you go to the directory using Explorer’s network neighborhood. For example, if you go to Explorer and click on `z:\tsmshar\earthtcp.bat`, the file will run. If you go to network neighborhood and click on `earth\tsmshar\earthtcp.bat`, the batch file will not run. Similarly, to issue the command from a command prompt, you must change to the shared directory. A warning is displayed if you enter a command such as `x:\tsmshar\setup`.

---

*Figure 19. Windows Networked Environment*
After they complete the procedure, the users can start their clients, contact the server, and perform a backup.

**Creating or Updating a Client Options File**

Each client requires a client options file, which contains options that identify the server, communication method, backup and archive options, space management options, and scheduling options. You can edit or create client options files in several ways, depending on the client platform and configuration of your system:

- **Any Client**
  
  Edit the `dsm.opt` client options file with a text editor at a client workstation. This is the most direct method, but it may not be best if you have many clients.

- **Windows Clients**
  
  Generate the `dsm.opt` client options file from the server with the Network Client Options File Wizard. This is easy and direct, and the wizard detects the network address of the TSM server. To run the wizard, do the following:
  
  1. From the TSM Console, expand the tree for the TSM server on which you want to create the file and click **Wizards**.
     
     The **Wizards** list is displayed in the right pane.
  2. Double-click **Client Options File** from the **Wizards** list to start the wizard.
  3. Follow the instructions in the wizard.

- **Networked Windows Clients with a Shared Directory on a File Server**
  
  Use the Remote Client Configuration Wizard to create a package that allows remote users to create client options files. The administrator uses the wizard to generate a client configuration file and stores the file in a shared directory. Clients access the shared directory and run the configuration file to create the client options file. This method is suitable for sites with many clients.

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**Managing TSM Client Schedules**

**Working with Schedules on Network Clients**

This section shows how to start TSM schedules that you have defined and how to verify that they are running correctly.

**Starting the Tivoli Storage Manager Scheduler**

The TSM Client Scheduler is the client component of the TSM scheduling model. The client scheduler runs as a Windows service and must be installed and running on the TSM client machine to execute any client schedules you define to the TSM server. The client scheduler can be installed using a wizard provided by the TSM client graphical interface. You can manually start the scheduler service on each client node, or update the `managedservices` option in the client options file to automatically start the scheduler service as required. Refer to Backup-Archive Installation and User’s Guide for more information.

**Verifying a Schedule**

You can verify that the automation is working as it should on the day after you define the schedule and associate it with clients. If the schedule runs successfully, the status indicates **Completed**.

**Note:** The include-exclude list (file on UNIX clients) on each client also affects which files are backed up or archived. For example, if a file is excluded from backup with an EXCLUDE statement, the file will not be backed up when the schedule runs.
From the administrative Web interface, do the following:

1. From the tree view, expand **Object View**.
2. Expand **Automation** and then expand **Client Schedules**.
3. Click **Query Client Events**.
4. Enter the appropriate information. To limit the query to display only schedules that did not run as expected, select **YES** in the **Exceptions only?** option. Click **Finish**. The operation displays the results.

Schedules that did not complete successfully have a status of **Failed**, **Missed**, or **Severed**.

Check the results of the schedule on one of the clients that was associated with that schedule. For most clients, scheduling information is stored in the file `dsmsched.log`.

---

### Managing TSM Client/Server Communications

#### Setting Client/Server Communications Options

This section helps you to set up Tivoli Storage Manager client/server communications.

Use the Server Options utility available from the TSM Console to view and specify server communications options. This utility is available from the **Service Information** view in the server tree. By default, the server uses the TCP/IP, Named Pipes, and HTTP communication methods. If you start the server console and see warning messages that a protocol could not be used by the server, either the protocol is not installed or the settings do not match the Windows protocol settings.

For a client to use a protocol that is enabled on the server, the client options file must contain corresponding values for communication options. From the Server Options utility, you can view the values for each protocol.

---

This section describes setting server options **before** you start the server. When you start the server, the new options go into effect. If you modify any server options after starting the server, you must stop and restart the server to activate the updated options.

---

For more information about server options, see the *Administrator’s Reference* or the TSM Console online help.

#### TCP/IP Options

Here is an example of TCP/IP setting:

```
commmethod tcpip
tcpport 1500
tcpwindowsize 8
tcpnodelay no
```

#### Named Pipes Options

The Named Pipes communication method is ideal when running the server and client on the same Windows machine because Named Pipes support is internal to the Windows base system. Named Pipes require no special configuration. Here is an example of a Named Pipes setting:
HTTP Options
Use the HTTP communication method for the administrative Web interface. HTTP and communications require a TCP/IP connection. Here are sample HTTP settings:

```
commmethod http
httpport 1580
```

To use the administrative Web interface, your browser must have Java 1.1.6 support. See “System Requirements” on page 27 for a list of supported browsers.

SNMP DPI® Subagent Options
TSM implements a simple network management protocol (SNMP) subagent. You can configure the SNMP subagent to send traps to an SNMP manager, such as NetView®, and to provide support for a management information base (MIB). For details about configuring SNMP for use with TSM, see the Administrator’s Guide.

The subagent communicates with the `snmpd` daemon, which in turn communicates with a management application. The `snmpd` daemon must support the DPI protocol. Agents are available on AIX®, Windows 95, Windows NT, and OS/2®. The subagent process is separate from the TSM server process, but the subagent gets its information from a server options file. When the SNMP management application is enabled, it can get information and messages from servers.

Here is an example of a SNMP setting. You must specify the COMMMETHOD option. For details about the other options, see the Administrator’s Reference.

```
commmethod snmp
snmpheartbeatinterval 5
snmpmessagecategory severity
```

Configuring TSM Client/Server Communication Across a Firewall
The Tivoli Storage Manager server and clients can work across a firewall in most cases. You must configure the firewall to open up the ports that the server and clients need. Because firewalls differ in how you open the ports, you must follow the instructions that accompanied the firewall software or hardware that you are using. If you need help with opening ports, contact the supplier of your firewall.

The following operations require that you open ports on the firewall:

- To allow clients to communicate with a server across a firewall, you must open the port that is the TCP/IP port for the server (the TCPPORT option in the server options file). The default TCP/IP port is 1500.
- To use the administrative Web interface for a server across a firewall, you must open the port that is the HTTP port for the server (the HTTPPORT option in the server options file). The default HTTP port is 1580.

We strongly recommend that you use the Tivoli Storage Manager Secure Web Administrator Proxy for Web administration of the Tivoli Storage Manager server in an enterprise environment. Install the proxy on a Web server that sits on the firewall, so that the Web server can access resources on both sides of the firewall (this is sometimes called the “demilitarized zone”). Once you set up the
proxy, you can use it to administer any TSM server at Version 3.7 or higher. For more information on how to install and use the proxy, refer to "Appendix E: Setting Up the Secure Web Administrator Proxy" on page 109. You can also increase security in this environment by enabling HTTPS services (also called secure socket layer, or SSL) on the Web server where you install the proxy. Check the information for your Web server for how to set this up.

- To use the Web backup-archive client to connect to a client across a firewall, you must use the client at Version 4.1.2 or later. You must open three ports on the firewall. The ports are:
  - The HTTP port for the client (the HTTPPORT option in the client options file). The default client HTTP port is 1581.
  - The two ports specified with the WEBPORTS option in the client options file. By default, Web ports are assigned randomly, which does not work across a firewall. You must specify this option with non-zero values for the two ports, then open these ports on the firewall.

Currently the following operations are known to have problems when a firewall is in place:
- The backup-archive Web client at a version earlier than Version 4.1.2 does not work when the client system or server that it connects to is across a firewall.
- The client scheduler operating in prompted mode does not work when the server is across a firewall. The client scheduler does work when operating in polling mode.
- The server cannot log events to a Tivoli Enterprise Console® (T/EC) server across a firewall.

Managing TSM Administrators

Registering Additional Administrators
If you are adding administrators, you should register them and grant an authority level to each.

![The name SERVER_CONSOLE is reserved for TSM console operations and cannot be used as the name of an administrator.](image)

From the administrative Web interface, do the following to register an administrative client and grant an authority level:
1. From the tree view, expand Administrators.
2. From the Operations drop-down menu, select and click on Register an Administrator.
3. Enter the required information and click Finish.

Changing Administrator Passwords
From the administrative Web interface, do the following to change the password of an administrator:
1. From the tree view, expand Administrators.
2. Select an administrator name.
3. From the Operations drop-down menu, select and click on Update an Administrator.
4. Enter the password and click Finish.
Appendix A. Performing a Minimal Configuration

TSM provides a minimal configuration option that allows you to quickly evaluate basic product function. This is the fastest way to test simple backup and archive operations. The TSM server instance created during minimal configuration stores backed-up data on your hard drive, instead of tape.

When you finish your evaluation, there are several ways to configure your server for use in a production environment:

1. Extend the server instance you created during minimal configuration by performing a wizard-based standard configuration.
2. Manually extend the server instance you created by using the TSM Web administrator, administrative command line, or a script.
3. Remove the server instance and create a new one by performing either the wizard-based standard configuration or a manual server configuration.

TSM allows you to remove a server instance without uninstalling server code, so you can easily return to a known starting point after changing settings and exploring product features. You can remove any server instances you create, whether you use a manual or wizard-based configuration process. See “Removing a Server Instance” on page 85 for instructions.

If you are planning to set up TSM for immediate use in a production environment, it is recommended that you follow the standard configuration process documented in “Chapter 4. Configuring Tivoli Storage Manager” on page 39. During the standard configuration, drive performance is analyzed to determine the best location for important TSM volumes. For more information about TSM configuration options, refer to “Overview of Initial Configuration” on page 38.

To perform a minimal configuration, do the following:

Install a TSM Server and Local Backup-archive Client

To quickly install the TSM server and client, do the following. For detailed instructions, refer to “Tivoli Storage Manager Installation Steps” on page 33.

1. Insert the TSM Windows Server CD-ROM.
   The TSM Server CD browser appears. (If autorun is disabled, run setup.exe in the CD root directory.)
2. Click **Install Products**.
   The **Install Products** dialog appears.

3. Click **TSM Server** and follow the installation instructions, using the default settings provided. You will need to specify a language for the installation dialogs.
   At the end of the server installation process, you might be prompted to restart your computer. Before restarting, complete step 4. If you are not prompted, no restart is required.

4. Return to the TSM Server CD browser **Install Products** dialog and click **TSM Backup-archive Client**. Follow the installation instructions, using the default settings provided.

   **Note:** If you plan to set up a TSM production environment using this server installation, you should also install the **TSM Server Licenses** and **TSM Device Driver**. You must restart your computer after installing the device driver.

---

**Configure the TSM Server**

To quickly configure the TSM server, do the following after you have installed the server and client. For detailed instructions, refer to "Performing the Initial Configuration" on page 41.

1. Double-click the **TSM Management Console** icon on the desktop.
The TSM Console window opens, with the Initial Configuration Task List displayed. Minimal configuration is selected by default.

![Initial Configuration Task List for Tivoli Storage Manager on JOHNANK](image)

Figure 21. TSM Console – Welcome

2. Click Start.

   The Server Initialization Wizard appears.

3. Click the Next button to proceed through the wizard pages, accepting the default settings provided. Refer to “Server Initialization Wizard” on page 47 for detailed instructions.

   Note: The amount of data you can back up during your test is determined by the free space available on the drive where the initial disk storage pool volume is placed.

Run a Test Backup

To quickly back up and restore some data, do the following. Refer to “Back up a Client” on page 63 for detailed instructions.

1. Start the TSM client. You can choose to have this done automatically after completing the initial configuration process. You can also double-click the TSM Backup Client desktop icon.

   The TSM Login dialog appears.

2. Click the Login button without entering a password.

   The Register New Node dialog appears. Enter a password for the client and click OK. The client is registered with the TSM server, and the client graphical interface appears.
3. Click the **Backup** icon.

   The **Backup** dialog appears, displaying a tree-view of local and remote drives.
4. Expand a local drive and select the check box next to a directory or some individual files. Click the Backup button. Backup data will be stored in local drive space designated for use as a virtual storage device. The amount of data you can back up depends on how much space is available on this drive. For more information, refer to “Minimal Configuration” on page 40. When the backup completes, a Backup Report appears.

5. To restore the files, close the Backup Report to return to the client graphical interface and click the Restore icon. The Restore dialog appears, displaying a tree-view of data stored by the TSM server.
6. Expand the **File Level** object to view the drive and directory structure for the files you backed up.

7. Select the **check box** next to a directory or some files, and click the **Restore** button.
   
The **Restore Destination** dialog appears.

8. Select **Original location** and click the **Restore** button.
   
   When the files are restored, a Restore Report appears.

---

**Where To Go From Here**

Refer to "Chapter 1. Introducing Tivoli Storage Manager" on page 1 to learn more about the full range of TSM function. Before setting up a production environment, it is important to take the time to understand the TSM approach to storage management. To further explore the capabilities of TSM, you can use the configuration and management wizards described on page 17 to customize the TSM server instance you just created.

"Default Configuration Results" on page 61 describes in detail the default TSM environment created during the configuration process.

**Ready to Set Up Your Production Environment?**

To set up a full production environment, you can extend the test server you created, or remove it and perform a standard configuration to create a new server instance. The best method depends on the complexity of your storage environment. In many cases, it is more efficient to remove the server instance and configure a new one.
Extending a Server Instance

If you extend the server instance created during minimal configuration, any data backed up during your evaluation will be preserved. You should consider moving the server database, recovery log, disk, and file volumes to optimize performance. If you plan to use any Tivoli Data Protection clients, or want to improve security, you should change open client registration to closed. See the Administrator’s Guide for more information.

To extend the server instance using the wizard-based process, do the following:

1. Double-click the TSM Management Console icon on the desktop.
   The TSM Console window opens.
2. Expand the Tivoli Storage Manager tree in the left pane, expand the local machine name, and expand TSM Server1.
3. Click Wizards.
   A list of wizards appears in the right pane.
4. Select Initial Configuration and click Start.
   The Initial Configuration Task List appears.
5. Select Standard Configuration and click Start.
   The Initial Configuration Environment Wizard appears.
6. Proceed through the sequence of wizards to extend the server configuration.

Removing a Server Instance

If you remove the server instance created during minimal configuration, any data backed up during your evaluation will be lost. However, when you create a new server, you will be able to take performance data into consideration when defining your TSM volumes, and closed client registration will be set by default.

To quickly delete a TSM server instance (without removing the server code), do the following:

1. Double-click the TSM Management Console icon on the desktop.
   The TSM Console window opens.
2. Expand the Tivoli Storage Manager tree in the left pane and expand the local machine name.
3. Right-click TSM Server1 and select Delete Server Instance.
4. Click the Select All button to mark all TSM server components for deletion.

   Note: During server initialization, it is possible to change the default location for data files. If you changed any default settings, carefully review the list to ensure that only the correct files are selected.

5. Click the Delete button.

See “Performing the Initial Configuration” on page 41 for standard server configuration instructions.
Appendix B. Performing a Silent Installation

This appendix describes how to perform a silent Tivoli Storage Manager installation. A silent installation runs unattended, requiring no monitoring or dialog box input. No installation wizards appear. Silent installation is run by using the MSIEEXEC command from the command line interface, or by incorporating the MSIEEXEC command into a command file. The command file can also be used to combine a silent installation of the server with a configuration of the server.

You can use the silent installation method to ensure consistent configuration if you are installing Tivoli Storage Manager on multiple computers with identical hardware. For example, if you have multiple Tivoli Storage Manager servers in different locations, you can produce and distribute a CD containing the same silent installation package for each server. You can also place a silent installation package on a file server for distribution over a network.

Because Tivoli Storage Manager is based on the Microsoft Windows Installer technology, all of the Tivoli Storage Manager components can be deployed using Active Directory and Group Policy. For more information on deploying Tivoli Storage Manager using Group Policy, refer to the Windows 2000 online help.

This appendix contains the following sections that describe how to use the silent installation function:
- “Installing the Server”
- “Installing the Licenses” on page 88
- “Installing the Backup-Archive Client” on page 88
- “Installing the Device Driver” on page 89
- “Feature Tables” on page 89
- “Including a Custom Client dsm.opt File” on page 90
- “Installation Troubleshooting” on page 91
- “Performing a Silent Uninstall” on page 91

Installing the Server

The MSIEEXEC command is used to silently install the Tivoli Storage Manager server, licenses, client, and device driver from the command line. Each of these components should be installed separately by specifying its respective feature information from the feature tables.

The source file of each component can be identified by its .msi extension. These files are located on the product CD.

For more information about the MSIEEXEC command, refer to Microsoft documentation.

The following is an example of installing the Tivoli Storage Manager server using the MSIEEXEC command for a silent installation. Explanations of the parameters follow the example.

Command
msiexec /i "c:\tsm_images\TSM51_Complete\server\Tivoli Storage Manager Server.msi"
RebootYesNo="No" REBOOT="Suppress" ALLUSERS=1 INSTALLDIR="e:\program files\tivoli\tsm"
ADDLOCAL="Online_Main,Online_Server_Readmes,Online_Server,Server_Base"
TRANSFORMS=1033.mst /qn /l*v "c:\server_log.txt"

/i   Specifies an installation.
"c:\tsm_images\TSM42_Complete\server\Tivoli Storage Manager Server 5.0.msi"
   Specifies the complete path to the server source package. Look for the actual source package on the product CD. It will have an .msi extension.

RebootYesNo="No" REBOOT="Suppress"
   Specifies that a reboot should not be performed. Except for the Tivoli Storage Manager device driver, it is recommended that you not allow a reboot of your machine when using silent installation.

ALLUSERS=1
   Specifies that the package is for all users. This parameter is required.

INSTALLDIR="c:\program files\tivoli\tsm"
   Specifies the destination path. If Tivoli Storage Manager is already installed on the system and you are upgrading your server, the existing path will be used as the destination path.

ADDLOCAL="Online_Main,Online_Server_Readmes,Online_Server,Server_Base"
   Specifies the list of features to install. See Table 17 on page 89 for a complete list.

TRANSFORMS=1033.mst
   Specifies the language transform to use. See Table 21 on page 90 for a complete list.

/qn   Specifies that this is a silent install.
/l*v "c:\install_log.txt"
   Specifies verbose logging and the name and location of the Tivoli Storage Manager installation log file.

### Installing the Licenses

The following is an example of installing the Tivoli Storage Manager licenses using the MSIEXEC command for a silent installation. Note that only the source package name and the ADDLOCAL parameter are different from the server install example.

**Command**

```
msiexec /i "c:\tsm_images\TSM51_Complete\licenses\Tivoli Storage Manager Licenses.msi"
RebootYesNo="No" REBOOT="Suppress" ALLUSERS=1 INSTALLDIR="e:\program files\tivoli\tsm"
ADDLOCAL=License TRANSFORMS=1033.mst /qn /l*v "c:\license_log.txt"
```

### Installing the Backup-Archive Client

The following is an example of installing the Tivoli Storage Manager backup-archive client using the MSIEXEC command for a silent installation. Note that only the source package name and the ADDLOCAL parameter are different from the server install example.

**Command**

```
msiexec /i "c:\tsm_images\TSM51_Complete\baclient\TivoliStorageManagerClient.msi"
RebootYesNo="No" REBOOT="Suppress" ALLUSERS=1 INSTALLDIR="e:\program files\tivoli\tsm"
ADDLOCAL="BackupArchiveGUI,BackupArchiveWeb,ApiRuntime,AdministrativeCmd, Online_Client_Readmes" TRANSFORMS=1033.mst /qn /l*v "c:\client_log.txt"
```
Installing the Device Driver

The following is an example of installing the Tivoli Storage Manager device driver using the MSIEXEC command for a silent installation. Note that only the source package name and the ADDLOCAL parameter are different from the server install example.

Command

```
msiexec /i "C:\tsm_images\TSM51_Complete\driver\Tivoli Storage Manager Device Driver.msi"
RebootYesNo="No" REBOOT="Suppress" ALLUSERS=1 INSTALLDIR="e:\program files\tivoli\tsm"
ADDLOCAL="Online_Main,Online_Driver_Readmes,DeviceDriver_Files"
TRANSFORMS=1033.mst /qn /i+v "c:\driver_log.txt"
```

Feature Tables

**Table 17. Server Features and Feature Descriptions**

<table>
<thead>
<tr>
<th>Server Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online_Main</td>
<td>Main HTMLHelp Online Information Files</td>
</tr>
<tr>
<td>Online_Server_Readmes</td>
<td>Server Readmes and HTMLHelp Books</td>
</tr>
<tr>
<td>Online_Server</td>
<td>Server HTMLHelp Online Book Files</td>
</tr>
<tr>
<td>Server_Base</td>
<td>Server and Management Console Files</td>
</tr>
<tr>
<td>chs</td>
<td>Simplified Chinese support</td>
</tr>
<tr>
<td>cht</td>
<td>Traditional Chinese support</td>
</tr>
<tr>
<td>deu</td>
<td>German support</td>
</tr>
<tr>
<td>esp</td>
<td>Spanish support</td>
</tr>
<tr>
<td>fra</td>
<td>French support</td>
</tr>
<tr>
<td>itn</td>
<td>Italian support</td>
</tr>
<tr>
<td>jpn</td>
<td>Japanese support</td>
</tr>
<tr>
<td>kor</td>
<td>Korean support</td>
</tr>
<tr>
<td>ptb</td>
<td>Portuguese support</td>
</tr>
</tbody>
</table>

**Table 18. Server License Feature and Feature Description**

<table>
<thead>
<tr>
<th>Server License Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>License</td>
<td>Server Licenses</td>
</tr>
</tbody>
</table>

**Table 19. Backup Archive Client Features and Feature Descriptions**

<table>
<thead>
<tr>
<th>Client Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BackupArchiveGUI</td>
<td>BA Graphical User Interface</td>
</tr>
<tr>
<td>BackupArchiveWeb</td>
<td>BA Web Client</td>
</tr>
<tr>
<td>ApiRuntime</td>
<td>API Runtimes</td>
</tr>
<tr>
<td>ApiSdk</td>
<td>API SDK</td>
</tr>
<tr>
<td>AdministrativeCmd</td>
<td>Administrative Command Line</td>
</tr>
<tr>
<td>Online_Client_Readmes</td>
<td>Client Readmes and HTMLHelp Book</td>
</tr>
<tr>
<td>BooksPdf</td>
<td>PDF Book</td>
</tr>
<tr>
<td>BackupArchiveGuiChs</td>
<td>Simplified Chinese GUI support</td>
</tr>
<tr>
<td>BackupArchiveWebChs</td>
<td>Simplified Chinese Web support</td>
</tr>
</tbody>
</table>
### Backup Archive Client Features and Feature Descriptions (continued)

<table>
<thead>
<tr>
<th>Client Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BackupArchiveGuiCht</td>
<td>Traditional Chinese GUI support</td>
</tr>
<tr>
<td>BackupArchiveWebCht</td>
<td>Traditional Chinese Web support</td>
</tr>
<tr>
<td>BackupArchiveGuiDeu</td>
<td>German GUI support</td>
</tr>
<tr>
<td>BackupArchiveWebDeu</td>
<td>German Web support</td>
</tr>
<tr>
<td>BackupArchiveGuiEsp</td>
<td>Spanish GUI support</td>
</tr>
<tr>
<td>BackupArchiveWebEsp</td>
<td>Spanish Web support</td>
</tr>
<tr>
<td>BackupArchiveGuiFra</td>
<td>French GUI support</td>
</tr>
<tr>
<td>BackupArchiveWebFra</td>
<td>French Web support</td>
</tr>
<tr>
<td>BackupArchiveGuiIta</td>
<td>Italian GUI support</td>
</tr>
<tr>
<td>BackupArchiveWebIta</td>
<td>Italian Web support</td>
</tr>
<tr>
<td>BackupArchiveGuiJpn</td>
<td>Japanese GUI support</td>
</tr>
<tr>
<td>BackupArchiveWebJpn</td>
<td>Japanese Web support</td>
</tr>
<tr>
<td>BackupArchiveGuiKor</td>
<td>Korean GUI support</td>
</tr>
<tr>
<td>BackupArchiveWebKor</td>
<td>Korean Web support</td>
</tr>
<tr>
<td>BackupArchiveGuiPtb</td>
<td>Portuguese GUI support</td>
</tr>
<tr>
<td>BackupArchiveWebPtb</td>
<td>Portuguese Web support</td>
</tr>
</tbody>
</table>

### Device Driver Features and Feature Descriptions

<table>
<thead>
<tr>
<th>Device Driver Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Online_Main</td>
<td>Main HTMLHelp Online Information Files</td>
</tr>
<tr>
<td>Online_Driver_Readmes</td>
<td>Readme.dev file</td>
</tr>
<tr>
<td>DeviceDriver_Files</td>
<td>Device driver and related files</td>
</tr>
</tbody>
</table>

### Transform and Language

<table>
<thead>
<tr>
<th>Transform</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>1028.mst</td>
<td>CHT Traditional Chinese</td>
</tr>
<tr>
<td>1031.mst</td>
<td>DEU German</td>
</tr>
<tr>
<td>1033.mst</td>
<td>ENG English</td>
</tr>
<tr>
<td>1034.mst</td>
<td>ESP Spanish</td>
</tr>
<tr>
<td>1036.mst</td>
<td>FRA French</td>
</tr>
<tr>
<td>1040.mst</td>
<td>ITA Italian</td>
</tr>
<tr>
<td>1041.mst</td>
<td>JPN Japanese</td>
</tr>
<tr>
<td>1042.mst</td>
<td>KOR Korean</td>
</tr>
<tr>
<td>1046.mst</td>
<td>PTB Portuguese</td>
</tr>
<tr>
<td>2052.mst</td>
<td>CHS Simplified Chinese</td>
</tr>
</tbody>
</table>

---

### Including a Custom Client dsm.opt File

Users who would like to install a predefined DSM.OPT file should place a copy of the DSM.OPT file in the CONFIG directory located within the install image.
The file must be named DSM.OPT.

The installation program will copy the predefined DSM.OPT file to the ..\BACLIENT directory when both of the following conditions are met:
- DSM.OPT does NOT exist in the ..\BACLIENT directory on the target computer.
- The installation program will not copy over an existing DSM.OPT file.
- DSM.OPT exists in the install image’s CONFIG directory, as described above.

### Installation Troubleshooting

**Table 22. Symptoms and Resolutions**

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Resolution</th>
</tr>
</thead>
<tbody>
<tr>
<td>If you receive a message during setup indicating that you do not have enough free space to install on a drive that does have free space.</td>
<td>Try updating an entry in the setup.ini file that is included with the package. If your package is on CD, you’ll have to copy the entire package to a hard drive so that you can edit setup.ini. Once setup.ini is available on your hard drive you can edit it and change the line DiskSpace=8000 to DiskSpace=0000.</td>
</tr>
<tr>
<td>If you receive a message indicating an internal error of 2735</td>
<td>Ensure that you have at least NT4 SP3 installed, including the level of Internet Explorer that ships with SP3 or higher.</td>
</tr>
<tr>
<td>If you do not see any TSM icons on the desktop after an install</td>
<td>Click on an empty area of the desktop and press F5 to refresh the desktop display.</td>
</tr>
<tr>
<td>If near the end of the installation process, a warning message box titled 'HTML 1.31 Update' displays with the text, &quot;This computer already has a newer version of HTML Help&quot;</td>
<td>Click on the OK button and continue.</td>
</tr>
<tr>
<td>If Silent Install doesn’t appear to work</td>
<td>Remove the /qn parameter and re-execute your msiexec command. Any errors should be displayed. After you fix the problem add the /qn parameter again.</td>
</tr>
</tbody>
</table>

### Performing a Silent Uninstall

You should stop any running Tivoli Storage Manager services before performing an uninstallation. To see which Tivoli Storage Manager services are running, you can type **net start** in a Windows command prompt. Look for any services that have Tivoli Storage Manager in them. If you have installed any Tivoli Storage Manager services using your own names, look for those as well. Each Tivoli Storage Manager service you plan to remove should be stopped. To stop a Tivoli Storage Manager service, type **net stop "service name"**. For example, to stop the first server instance you can type **net stop "tsm server1"**.

You can silently uninstall the Tivoli Storage Manager server, licenses, and device driver by using the /x parameter instead of the /i parameter for each command. All other parameters remain the same.

The following is an example of silently uninstalling the Tivoli Storage Manager server using the MSIEXEC command.

**Command**
msiexec /x "c:\tsm_images\TSM51_Complete\server\Tivoli Storage Manager Server 5.0.msi"
RebootYesNo="No" REBOOT="Suppress" ALLUSERS=1 INSTALLDIR="c:\program files\tivoli\tsm"
ADDLOCAL="Online_Main,Online_Server_Readmes,Online_Server,Server_Base"
TRANSFORMS=1033.mst /qn /l+v c:\install_log.txt
Appendix C. Setting Up Active Directory

Active Directory is the directory service included with the Windows 2000 Server. A directory service identifies network resources and makes them available to users and applications. One of the challenges of working within a large distributed network is identifying and locating resources, such as users, groups, print queues, and documents. A directory service is like a phone directory. Given a name for a network resource, it provides the information necessary to access that resource, without necessarily knowing its physical location. Each Active Directory exists within the boundary of a Windows domain. Refer to the Windows 2000 online help and documentation set for detailed information about Active Directory.

Overview: Using TSM With Active Directory

TSM exploits the capabilities of active directory to enumerate and manage TSM clients. Active directory can be used to automate TSM client node registration and management. Active directory services are scalable, so administrators can add and remove TSM Servers and their entire inventories of client nodes as required.

When TSM servers are added, their registered client nodes also become part of the domain and are included in the Active Directory. TSM provides an Active Directory Configuration wizard that can be used to add and remove TSM servers. This wizard can be accessed from the TSM Console. TSM commands that add, remove, and rename TSM client nodes automatically update the Active Directory.

The TSM Server interacts with the Active Directory service when it is started. At that time the following sequence of events takes place with respect to Active Directory:

**TSM Server:**
- Defines itself to the Active Directory when it is started

**TSM Client:**
1. Connects to the Active Directory server for communication protocol information
2. Looks up protocol information in Active Directory and stores it in its options file
3. Connects with the TSM Server

Configuration Instructions

Configuring Active directory Services involves configuring Active Directory within the Windows 2000 operating system and then extending the Active Directory Schema specifically for TSM, so that TSM Servers and their inventories of TSM client nodes become part of the Active Directory.

The following tasks are required to set up the Active Directory environment and TSM:

- Configure Active Directory on the Windows 2000 machine
- Perform a one-time configuration for TSM and Active Directory
- Configure each TSM server instance
Configuring Active Directory on the Windows 2000 Machine

Configuring Active Directory within Windows 2000 involves setting up the Windows machine as a domain controller and adjusting the Domain Naming Service (DNS) for Active Directory. Any Windows Server that has been set up as a domain controller is a candidate to become an Active Directory Server. Refer to the Windows 2000 online help (Active Directory Checklist) and documentation for more information.

Performing the One-time Configuration

Configuring Active Directory for TSM involves using the Active Directory Configuration Wizard to extend the active directory schema and to define TSM Servers and their respective client nodes to Windows Active Directory Servers. This process requires the following tasks:

- Install Windows 2000 Administration Tools on your Windows 2000 Domain Controller
- Create a Windows account with permissions to extend the Active Directory Schema
- Extend the Active Directory Schema for TSM

Installing Windows 2000 Administration Tools

The steps required to update the schema involve the use of the Active Directory Schema snap-in. This snap-in is part of Windows 2000 Administration Tools, which is included on the Windows 2000 Server and Advanced Server compact disc sets. These tools enable administrators to manage the active directory schema on a Windows 2000 domain controller.

1. Load the compact disc (CD) into the Windows 2000 computer CD drive.
2. Open the I386 folder.
3. Double click the Adminpak.msi file.
4. Follow the instructions that appear in the resulting setup wizard.

Creating a Windows Account With Required Permissions

Administrators can use this procedure to create a separate account, other than the default system account, for the TSM Server service. The system account does not have the permissions required for Active Directory. After the Windows 2000 Administration Tools have been installed, administrators can configure permissions.

From the domain controller containing the Active Directory schema, do the following:

1. Click Start | Run.
   The Run dialog opens.
2. Type schmmgmt.msc in the Run dialog entry field and click OK.
   The Active Directory schema snap-in opens.
3. In the console tree, right-click Active Directory Schema and select Operations Master.
4. Click The Schema may be modified on this domain controller.
5. In the console tree, right-click Active Directory Schema and select Permissions.
6. If you don’t see your name in the name section, click Add.
7. Select your account name, click Add, and click OK.
8. Select the account name and check the Full Control checkbox in the Allow column of the Permissions area. Click OK.
Extending the Active Directory Schema

System administrators must allow TSM to update the Active Directory Schema before TSM can store information in and retrieve information from Active Directory. The Active Directory Schema, stored on the Windows 2000 domain controller, is a list of definitions that identifies objects and information about those objects. This one-time configuration allows TSM to extend the schema by adding objects to the schema that define TSM servers.


An administrator must perform the following one-time operation to extend the Active Directory schema before adding the first TSM Server:

1. Expand the TSM Console tree until the TSM Server you want to add to the Active Directory is displayed.
2. Expand the TSM Server and click Wizards.
3. The TSM wizards are listed in the right pane.
4. Click Active Directory Configuration in the Wizards list.
   The Active Directory Configuration wizard appears in the right pane.
5. Click the Start button to start the wizard and click Next.
6. Click the Detect button and click Next.
7. No entries appear at this time, but the schema has been updated. Click Cancel.

At this point, you can disable the permissions to extend the schema. To disable permissions, return to the schema snap-in, right-click Active Directory Schema, and click Permissions. Select your account name, uncheck the Full Control checkbox, and click OK. If you want to disable further schema updates you can right-click on the Active Directory Schema, and click Operations Master. Uncheck The Schema may be modified on this Domain Controller and click OK.

Configuring Each TSM Server Instance

Configuring the TSM server and managing TSM in an Active Directory environment involves the following tasks:

- Configure the TSM server to define itself to Active Directory when it is started
- Add TSM client nodes to or remove them from TSM server in the Active Directory
- Add TSM Server to or remove one from the Active Directory
- Import nodes from one TSM Server to another

TSM allows administrators to add or edit server entries so that they can define non-Windows TSM servers to Active Directory. When TSM clients look up TSM servers in Active Directory they do not know what platforms the servers are running on nor do they care. They are just looking for communication parameters that they can use to connect to a TSM server that knows about them.

Configuring the TSM Server to Define Itself to Active Directory

TSM servers running on Windows can define themselves to Active Directory when they start up and they can also remove themselves from Active Directory when they are halted. Administrators can modify the three server options that control TSM Server behavior regarding Active Directory.
Note: Typically, the TSM server is run as a Windows service. The TSM server service should be configured to run under an account other than the default System Account because the System Account does not have the permissions needed to access Active Directory over the network. Administrators can modify the service account using the Service Configuration wizard in the TSM Console.

1. Expand the TSM Console tree until the TSM server for which you want to modify options is displayed. Expand the Server and expand Reports.

2. Click Service Information.
   The Service Information report appears in the right pane. The TSM server, running as a service, should appear in the Service Information report. If the server does not appear in the report, ensure that you have initialized the server using the Server Initialization wizard in the TSM Console.

3. Right click the TSM server service and select Edit Options File.
   The Server Options File tabbed dialog appears.

4. Click the Active Directory tab.
   The Active Directory options appear.

5. Check Register with Active Directory on TSM server startup.

6. Check Unregister with Active Directory on TSM server shutdown.

7. Select Automatically Detect in the Domain Controller section Click OK.

The next time the TSM server starts, it defines itself to Active Directory and adds information including the list of registered nodes and protocol information. This can be verified at any time using the Active Directory Configuration wizard in the TSM Console.

Adding or Removing TSM Client Nodes
Adding TSM client nodes to and removing them from Active Directory is a matter of adding the nodes to or removing them from a TSM Server that has already been added to the Active Directory. TSM automatically updates the Active Directory.

Note: Do not attempt to add or expect to see TSM clients running Windows 95 or Windows 98. At this time, only Backup-Archive clients running on Windows NT or Windows 2000 are supported. Backup-Archive clients on Windows 95/98 cannot currently access the TSM Active Directory entries.

1. Expand the TSM Console tree until the TSM server on which you want to add or remove TSM nodes is displayed.

2. Expand the server and click Wizards.
   The Wizards list appears in the right pane.

3. Click Active Directory Configuration in the Wizards list and click Start.
   The Active Directory Configuration wizard starts.

4. Navigate to the dialog entitled TSM Active Directory Configuration.

5. Select a TSM server in the List of TSM Servers in Active Directory dialog and click Edit.
   The Settings dialog appears for the selected TSM server with the Nodes tab displayed.

6. Click Add or Remove.
   The Node Name that needs to be added to the server dialog appears.

7. Enter the node name for the TSM client node you want to add to or remove from this server. Click OK.
You can also connect a client node with a TSM server during the client configuration process. To select a server, click the **Browse** button on the communications protocol parameters page of the Client Configuration Wizard. The wizard displays a list of TSM servers with which the node is registered and that support the selected protocol. When you select a server and complete the wizard, the corresponding communication protocol information is included in the client options file.

**Removing a TSM Server from the Active Directory**

1. Expand the TSM Console tree until the TSM server you want to remove from the Active Directory is displayed.
2. Expand the server and click **Wizards**.
   - The **Wizards** list appears in the right pane.
3. Click **Active Directory Configuration** in the **Wizards** list and click **Start**.
   - The wizard opens to the introductory dialog.
4. Navigate to the dialog entitled **TSM Active Directory Configuration**.
5. Select the TSM server you want to remove and click **Remove**.
6. The TSM server is deleted from Active Directory.

---

**Storage and Replication Impact**

The information TSM stores in the Active Directory consists of a list of TSM servers and associated clients. Each TSM server also contains the communications settings defined for that server. All information is stored in TSM-specific attributes that are installed as part of the schema extensions. A detailed description of the TSM Active Directory schema extensions is available from the TSM Web site at [http://www.tivoli.com/support/storage_mgr/adwserv.htm](http://www.tivoli.com/support/storage_mgr/adwserv.htm).

Table 23 describes the attributes TSM uses to store information in the Active Directory.

<table>
<thead>
<tr>
<th>Attribute Common Name</th>
<th>Description</th>
<th>Parent Container/Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM-TSM-SRV-ADDRESS</td>
<td>HTTP Address</td>
<td>IBM-TSM-SRV-TCPHTTPCLASS</td>
</tr>
<tr>
<td>IBM-TSM-SRV-PORT</td>
<td>HTTP Port</td>
<td>IBM-TSM-SRV-TCPHTTPCLASS</td>
</tr>
<tr>
<td>IBM-TSM-SRV-ADDRESS</td>
<td>Named Pipe Address</td>
<td>IBM-TSM-SRV-NAMEDPIPECLASS</td>
</tr>
<tr>
<td>IBM-TSM-SRV-ADDRESS</td>
<td>TCPIP Address</td>
<td>IBM-TSM-SRV-TCPHTTPCLASS</td>
</tr>
<tr>
<td>IBM-TSM-SRV-PORT</td>
<td>TCPIP Port</td>
<td>IBM-TSM-SRV-TCPHTTPCLASS</td>
</tr>
<tr>
<td>IBM-TSM-SRV-NODENAME</td>
<td>Node Name</td>
<td>IBM-TSM-SRV-NODECLASS</td>
</tr>
</tbody>
</table>

The Active Directory disk storage requirements are dependent on the number of TSM servers and clients registered for the particular installation. The disk storage requirement for a full replica can be represented by the following formula:

\[
\text{Disk Usage} = \text{NumberOfServers} \times (4.1KB + (\text{NumberOfClients} \times 2.04KB))
\]
The Active Directory disk storage requirements for Global Catalog servers (partial replicas only) are dependent on the same factors. The disk storage requirement for a partial replica can be represented by the following formula:

\[
\text{Disk Usage} = \text{NumberOfServers} \times (4.1\text{KB} + (\text{NumberOfClients} \times 2.04\text{KB}))
\]

Typical TSM usage will consist of only minor changes to the data stored in the Active Directory. This information will only change when new servers are defined, client nodes are registered, or communications parameters are changed. Since these parameters change very infrequently on a day-to-day basis, the network traffic requirement is very low. Network bandwidth required will be under 100KBytes of data per day for both partial and full replicas.
Appendix D. Setting Up Clustering

As the Administrator, you need to determine whether or not clustering is something you need or want to take advantage of for your TSM server configuration. To assist you with this decision, the first two sections of this Appendix introduce the concepts of clustering and the TSM server in a cluster. The rest of the appendix covers the actual steps you need to take to successfully configure a cluster and establish a failover pattern. If you need additional information regarding clustering, refer to the appropriate Microsoft and TSM documentation.

### Concepts:
- "Introduction to Clustering" on page 100
- "TSM Server in a Cluster" on page 101
- "Planning the Cluster Configuration" on page 101
- "General Considerations" on page 101
- "Planning for the Basic Virtual Server" on page 101

### Tasks:
- "TSM Cluster Setup" on page 104
- "Preparing the Cluster Groups for a Basic Virtual Server" on page 104
- "Install TSM on Computers in the Cluster" on page 104
- "Configure TSM on the Servers" on page 104
- "Configuring TSM on the First Node" on page 105
- "Configuring TSM on the next Server" on page 106
- "Configuring TSM for Multiple Servers" on page 107
- "Clustering Configuration Worksheet" on page 108

### Introduction to Clustering

A cluster is a set of independent computers working together as a single system. This grouping ensures that mission-critical applications and resources are as highly available as possible. The cluster is managed as a single system and is specifically designed to tolerate component failures in a way that is transparent to users. Clustered systems have several advantages: fault-tolerance, high availability, and simplified management.

Microsoft Cluster Server (MSCS) is a feature of Windows. It is software that supports the connection of two or more computers into a cluster. The software provides services such as failure detection, recovery, and the ability to manage the cluster as a single system.

An MSCS cluster consists of nodes, individual computers complete with their own processor, memory, and system disks. Nodes in an MSCS cluster must have access to at least one shared disk. The data files, Internet Protocol (IP) addresses, network shares, and other parts of the installed server applications on the nodes are the
cluster’s resources. A resource can be active on only one node at a time. When the cluster detects that a resource has failed, it relocates the failed resource to a different node.

MSCS organizes resources into relational groups. One type of relationship is a dependency relationship. For example, an application requires a network name and Transmission Control Protocol/Internet Protocol (TCP/IP) address to become active before the service comes online. You can specify the TCP/IP address resource, network name resource, and service as resources that belong to the same group. When MSCS detects a resource failure, it moves all the resources in the failed resource’s group to a different node and restarts the failed resource. In addition, you can establish dependencies between various resources in the same group so that they come online in a specific order.

When configuring a cluster resource group, you can designate which node in the cluster takes over when another node in the cluster fails. You can assign one or more nodes as possible owners of the group being failed over. In addition, you can indicate the order in which the cluster should select the new owner. In this way you are defining the failover pattern for the resource group.

From the outside, an MSCS cluster appears to be one computer because MSCS supports the concept of virtual servers. MSCS creates a virtual server to represent a particular application. When MSCS moves a virtual server from a failed system to a working node in the cluster, clients are not aware of the change. This is because they are talking to the virtual server. Clients do not talk to the node to which the virtual server is mapped. As a result of the move, a client might notice only a pause in service.

**TSM Server in a Cluster**

The TSM server is configured as an MSCS virtual server. The cluster resource group that is the virtual server contains a Network Name resource, and IP resource, one or more physical disk resources, and a TSM server resource. The virtual server name is independent of the name of the physical node on which the virtual server runs. The virtual server name and address migrate from node to node with the virtual server. Because the virtual server cannot share data, each virtual server has a separate database, recovery log, and set of storage pool volumes.

Each TSM virtual server must contain a TSM server instance that is unique across all the nodes of the cluster. The TSM wizards used to configure the TSM virtual server group enforce this restriction. However, you can configure multiple TSM virtual servers into the cluster. In addition each TSM virtual server must have a private set of disk resources. Although nodes can share disk resources, only one node can actively control a disk at a time.

Typically a TSM server uses tape devices a great deal. MSCS does not support the failover of tape devices. This can become a problem that is difficult to handle and reduces the effectiveness of the cluster. To solve this problem, TSM supports tape device failover. Rather than provide a generic solution, TSM has provided a solution based on a specific hardware and software combination that will support tape failover.

TSM tape failover support does not change the basic concept of a TSM virtual server. All the same resources are still required. Tape failover support is additional.
capability that can be added to a TSM virtual server. Even though Windows 2000 Datacenter Server supports a 4 node cluster, TSM Tape Failover support will only function on 2 nodes of the cluster.

TSM makes use of a shared SCSI bus connecting the two nodes of the cluster that will host the TSM virtual server. This requires that each node must contain an additional SCSI adapter card. The tape devices (library and drives) are connected to this shared bus. When failover occurs, the TSM server issues a SCSI bus reset during initialization. The bus reset is expected to clear any SCSI reserves held on the tape devices. This allows the server to acquire the devices after the failover.

Planning the Cluster Configuration
To set up a cluster requires considerable planning by the Administrator. You need to answer the following questions and it is recommended you record the critical information on the Cluster Configuration worksheet (described a little latter in this write-up).

General Considerations
1. What type of cluster solution best fits my business needs?
2. What type of failover pattern do I need?
   Only certain versions of Windows will support more than a two node cluster. The use of tape failover support also affects the pattern.
3. Will tape failover support be needed?
   You should consider how tape devices will be used by the TSM virtual server. Remember that this limits the number of nodes in the failover pattern to two.
4. What are the resources to be dedicated to TSM?

Planning for the Basic Virtual Server
1. Determine the failover pattern for the virtual server. To accomplish this task, you must choose the set of nodes that will host the TSM virtual server.
2. Decide which type of cluster configuration to use. Each virtual server needs a separate set of disk resources on the shared disk subsystem. If you configure the I/O subsystem as one large array for a single virtual server configuration, you may have problems later. The problems will occur when you try to support a multiple virtual server configuration.
3. Identify the disk resources to be dedicated to TSM. A shared disk should not be divided into multiple partitions with each partition assigned to a different application and thus a different cluster group. For example, Application A, a stable application, could be forced to failover due to a software problem with Application B if both applications use partitions that are part of the same physical disk. This could happen, for example, when a software problem with Application B occurs. This problem causes the Cluster Services to failover Application B and its corequisite disk resource. Because the partitions exist on the same physical drive, Application A is also forced to failover. Therefore, we recommend that you dedicate a shared disk as a single failable resource along with the Tivoli Storage Manager application.
4. Ensure that you have enough IP addresses. You need at least seven addresses to set up a cluster involving two TSM virtual servers. This would be in accordance with Microsoft’s default recommendations:
   • Four IP addresses for the Network Interface Cards (NIC). Each node in the cluster uses two NICs. One NIC handles intracluster communication in the private high-speed network. The other NIC handles communication with the outside network and serves as a backup for intracluster communication.
• One IP address for the cluster because it constitutes a virtual server.
• One IP address for each virtual TSM server.

5. Obtain Network Names for each TSM server instance in the configuration. For a cluster involving two TSM virtual servers, two Network Names are required and they must be associated with the IP Addresses set aside for each TSM server.

6. Ensure that each TSM server instance has a cluster resource group. Initially, the group should contain only disk resources. You can create a new group and move disk resources to it. You may choose just to rename an existing resource group that contains only disk resources.

7. Determine the disk to be used on each node. Tivoli Storage Manager is installed to a local disk on each node in the cluster. We strongly recommended that the same drive letter be used on each machine.

8. Attach tape devices in either of the following configurations highlighted in the table if you choose not to use TSM tape failover support. MSCS does not provide for resource management of SCSI tape devices, however, TSM does. If you choose to use TSM tape failover support, proceed to “Planning for TSM Tape Failover Support”.

<table>
<thead>
<tr>
<th>Attach to the node on which the TSM server instance is currently active.</th>
<th>Attach to a third, non-clustered system on which an additional instance of the TSM server is active.</th>
</tr>
</thead>
<tbody>
<tr>
<td>This configuration allows high performance backup and restore. However, it is not entirely automated. Operator intervention is required to service a failover where repair delays take more than 2 days.</td>
<td>This configuration may not be acceptable in installations with low bandwidth communications between the servers in the cluster and the tape device controller server.</td>
</tr>
<tr>
<td>Define enough disk-based data volume space to keep more than 2 days worth of average data.</td>
<td>Define enough disk-based data volume space to keep more than 2 days worth of average data.</td>
</tr>
<tr>
<td>Set up a storage pool hierarchy so that data is migrated efficiently to the tape device.</td>
<td>Use the virtual volumes to enable migration of the data from the local disk volumes to the tape device.</td>
</tr>
<tr>
<td>When a failover occurs, manually disconnect the tape device and reattach it to the node on which the server was newly active.</td>
<td>When a failover occurs, no operator intervention is required; the newly active server continues to use the virtual volumes as before.</td>
</tr>
</tbody>
</table>

### Planning for TSM Tape Failover Support

This section describes a specific hardware and software configuration for TSM tape failover support. Currently, it is the only configuration that has been tested and that is officially supported. Other configurations might also work, but they have not yet been tested by IBM. Table 24 describes the hardware and software tested for use with TSM tape failover.

<table>
<thead>
<tr>
<th>Table 24. Hardware and Software Supported for Tape Failover</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Operating System</strong></td>
</tr>
<tr>
<td><strong>SCSI Adaptor</strong></td>
</tr>
<tr>
<td><strong>SCSI Tape Library</strong></td>
</tr>
</tbody>
</table>
To use TSM tape failover, do the following before installing and configuring TSM:

1. Perform all the planning steps described for a basic virtual server except for the last step.

2. Ensure that your hardware configuration meets the following criteria:
   - All hardware must be identical, slot for slot, card for card, for both nodes.

   **Note:** TSM Tape Failover is supported for only 2 nodes of the cluster.
   - SCSI cables are used to attach the shared tape devices to both computers.
   - The SCSI bus is properly terminated. See "Terminating the Shared SCSI Bus".
   - A second SCSI adaptor is installed on each cluster node to provide a shared external bus between the two computers.
   - A SCSI tape library containing one or more SCSI tape drives is being used.

3. Ensure that the SCSI bus is properly configured (prior to installation).

4. Ensure that each device on the shared SCSI bus has a unique SCSI ID, both SCSI controllers and tape devices.

   **Note:** Most SCSI controllers default to SCSI ID 7. Thus one of the SCSI controllers must have its ID changed to a different number, such as SCSI ID 6. This ensures that the host adapters have the highest priority on the SCSI bus.

5. Ensure that the SCSI bus resets are disabled. You will want to do this because there is a tendency for SCSI controllers to reset the SCSI bus when they initialize at boot time. The bus reset can interrupt any data transfers between the other node and tape devices on the shared SCSI bus.

6. Ensure that only tape devices are connected to the shared bus.

   **Note:** CD-ROM drives or removable media devices should not be used on the shared bus.

7. Ensure that the device names assigned by either the Windows device driver or the TSM device driver (ADSMSCSI) are the same on both machines. If the names do not match on both machines, the TSM Tape Failover support cannot be configured.

**Terminating the Shared SCSI Bus**

The following presents methods for terminating the shared SCSI bus. You must terminate the shared SCSI bus as part of the initial setup of SCSI tape failover. Also, the shared SCSI bus must be terminated before you bring a server back online.

There are several different methods that can be used to terminate the shared SCSI bus:

- **SCSI controllers**
  SCSI controllers have internal termination that can be used to terminate the bus, however this method is not recommended with Cluster Server. If a node is offline with this configuration, the SCSI bus will not be properly terminated and will not operate correctly.

- **Storage enclosures**
  Storage enclosures also have internal termination. This can be used to terminate the SCSI bus if the enclosure is at the end of the SCSI bus.

- **Y cables (recommended termination method)**
  Y cables can be connected to devices if the device is at the end of the SCSI bus. A terminator can then be attached to one branch of the Y cable in order to
terminate the SCSI bus. This method of termination requires either disabling or removing any internal terminators the device may have.

- **Trilink connectors (recommended termination method)**
  Trilink connectors can be connected to certain devices. If the device is at the end of the bus, a trilink connector can be used to terminate the bus. This method of termination requires either disabling or removing any internal terminators the device may have.

**Note:** Any devices that are not at the end of the shared bus must have their internal termination disabled.

**TSM Cluster Setup**

To install TSM in a cluster, requires that the cluster be fully functional. Thus MSCS must be installed and configured on your servers. It is not the intent of this publication to duplicate the MSCS documentation that explains how this is done. Instead you will want to check the end results of that installation by doing the following:

1. Ensure that the Windows operating system is installed on all computers that are part of the cluster.
2. Ensure that MSCS is installed and configured for all the computers in the cluster.
3. Verify that each node and shared disk in the cluster is operational.
4. Ensure that the shared SCSI bus and tape devices are operational if TSM tape failover support is being used.

**Preparing the Cluster Groups for a Basic Virtual Server**

Prepare one or more cluster groups. Each TSM server instance requires a cluster resource group. Initially, the group must contain only disk resources. You can create a new group and move disk resources to it. You can choose to rename an existing resource group that contains only disk resources. Use the Cluster Administrator program on the computer that owns the shared disk or tape resource to prepare your resource group.

As you construct your resource groups consider the following:

- Ensure that each resource group has been given a distinctive name. For example, TSM SRV1 and TSM SRV2. Do not change the names after the group has been created as this can cause a corrupt configuration.
- Ensure that all nodes in the cluster are online.
- Ensure that the group is online and owned by the node where the initial server instance will be installed.
- Test the cluster to ensure proper operation of each server and the shared disk.

**Install TSM on Computers in the Cluster**

On every node that will host a TSM virtual server, install TSM.

1. Install TSM to a local disk. Use the same local-disk drive letter for each node.
2. Restart the system after TSM installation completes. Do not start TSM Initial Configuration after restart.

**Configure TSM on the Servers**

The TSM cluster configuration procedure must be performed on the set of nodes that will host a TSM virtual server. However, the steps in the procedure vary depending upon which node you are currently configuring. When configuring the first node in the set, the TSM server instance is actually created and configured.
When configuring the remaining nodes in the set, each node is updated in such a way that permits it to host the TSM server instance created on the first node. A TSM server must be installed on the first node in the set before configuring the remaining nodes in the set. Violating this requirement will cause your configuration to fail. It is also recommended that you completely configure one virtual server before moving on to the next when configuring multiple virtual servers. Because you are dealing with separate IP addresses and network names for each virtual server, you lessen the possibility of mistakes by configuring each virtual server separately.

Configuring TSM on the First Node

From within the TSM Console:

1. Start the Initial Configuration process. For more information see "Chapter 4 Configuring Tivoli Storage Manager" on page 39.

   Note: You must select Standard configuration to enable automatic detection of a clustered environment.

2. Proceed through the steps to configure the TSM server. The Initial Configuration process consists of a sequence of wizards.

3. Click Yes to have TSM configured for use with a Windows cluster.

4. Click Next and the Select the Cluster group dialog displays.

5. Select the cluster group that will be configured for the TSM server.

6. Click Next and follow the directions to complete the Server Initialization Wizard input. When the Server Initialization Wizard completes its processing, the TSM Cluster Configuration Wizard is started.

The first page of the wizard is an introduction page. Your input starts on the second page displayed which is titled Select the Cluster Group.

1. Select the cluster group being configured. This must match the group you selected during the Server Initialization Wizard process.

2. Click Next. The Tape Failover dialog is displayed. If the Tape Failover dialog is displayed as active (input can be accepted) it is because this may be a valid option for you. Complete the tape failover configuration as follows; otherwise click Next. The TCP/IP Parameters window is displayed. Go on to step 3 if you are not configuring for a tape device.

   a. Select Configure TSM to manage tape failover. The input fields open up for input/confirmation.

   b. Select the node name connected to the shared SCSI bus.

      Note: There may be several node names listed. You need to select the one that is connected to the shared SCSI bus on the other end from your input machine.

   c. Select the name of the tape device that is on the bus to be used for tape failover.

   d. Click Next. If everything is connected correctly, the TCP/IP Parameters window is displayed. If there is a problem, the Tape Failover dialog is returned with the input fields greyed out. Also an error message is displayed. When this happens, you need to cancel the process and check your connections. You are not allowed to go on with Cluster configuration.

   e. Proceed through the rest of the Cluster Configuration windows; from step 3 onward. This will finish the processing for the first node.
3. Input the IP Address, Subnet Mask, and select the Network being used by the cluster. This information is contained on your worksheet.
4. Click Next. The Network Parameters dialog is displayed.
5. Input the cluster network name. This is also the virtual server name.
6. Click Next. The Cluster Configuration Wizard completes the configuration process for the first node and displays a dialog that shows the configured setup.
7. Click Finish to complete the cluster configuration.
8. Continue with the initial configuration.

After completing the Initial configuration, you will stop the server instance and get ready to configure the next server in the set of nodes.

Configuring TSM on the next Server

After you complete a TSM install on the first node, you can configure TSM on the remaining nodes in the set.

1. Use the Cluster Administrator to move the resource group to the server.
2. Open the TSM Console.
4. Proceed through the steps to configure a TSM server until you reach the Server Initialization wizard. The Windows cluster is detected and a Cluster Environment dialog is displayed.
5. Click Yes and then Next. The Select the Cluster group dialog is displayed.
6. Select the group where this server instance will reside. Make a note of this group name. It must match the group selected during configuration of the first node in the set.
7. Click Next and follow the directions to complete the Server Initialization wizard input.
8. When the Server Initialization Wizard completes its processing, the TSM Cluster Configuration Wizard is started. The second time through the Cluster Configuration Wizard you should have your worksheet close at hand so as to avoid errors with addresses and other information critical to the cluster configuration.

The TSM Cluster Configuration Wizard has started and the second page displayed is the Select the Cluster Group page.

1. Select the cluster group being configured. This must match the group you selected during the Server Initialization Wizard process.
2. Click Next. The Tape Failover dialog is displayed. All the fields are greyed out. This occurs because during the configuration process of the first node, TSM gathered enough information to fill in the information for the second node. There is no reason to change anything. TSM just needs to verify the connection settings from this node.
3. Click Next.
   - If everything is connected correctly, you can proceed through the rest of the Cluster Configuration windows.
   - If there is a problem, the Tape Failover dialog is returned. Also an error message is displayed. When this happens, you need to cancel the process and check your connections. You are not allowed to go on with Cluster configuration.
4. Click **Next**. The Cluster Configuration Wizard completes the configuration process for the second server and displays a window that shows the configured setup.

5. Click **Finish** to complete the cluster configuration.

At this point, you have completed the configuration of another node in the set of nodes. If this is the last node in the set, the cluster has been updated and the resource group has been completed. The TSM virtual server is now functional and must be managed from the Cluster Administrator.

### Configuring TSM for Multiple Servers

To create additional TSM virtual servers, you need to create an additional cluster group with a unique name. You must also provide a unique set of cluster resources for the new virtual server.

1. Follow the planning steps outlined above to prepare for the new TSM virtual server.
2. Follow the configuration steps outlined above for each node in the set of nodes that will host the new TSM virtual server.
3. Ensure that you select the correct cluster group when prompted in the Server Initialization and Cluster Configuration wizards.
4. Ensure that you enter the unique TCP/IP information and network name.
You may want to use the following worksheet for each virtual server instance that will be part of your cluster.

<table>
<thead>
<tr>
<th>Cluster Resource Group</th>
<th>Physical Disk Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>IP Address</th>
<th>Subnet Mask</th>
<th>Network</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Network Name (server name)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Nodes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tape Failover (optional)</th>
<th>SCSI Controller ID (first node)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>SCSI Controller ID (second node)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Device name — both nodes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix E. Setting Up the Secure Web Administrator Proxy

The Tivoli Storage Manager Secure Web Administrator Proxy provides a secure method for the TSM administrative Web interface to retrieve Web pages without affecting the performance of the server. A Web proxy on a separate Web server machine, not the Tivoli Storage Manager server, fills requests from the administrative Web interface for images and HTML pages. A single Web server can handle requests for multiple Tivoli Storage Manager servers on different platforms as shown in Figure 25.

The Web proxy connects to Tivoli Storage Manager as a client, secures the connection, and retrieves Web pages or submits forms. The TSM server responds with the requested HTML pages and redirects the URLs in the page to the Web proxy. When the Web proxy receives the response, it passes the information to the Web server. The Web server’s Secure Socket Layer (SSL) package encrypts the information and returns it to the Web browser.

Prerequisites

To install, configure, and use the Web proxy, you need the following:

- A Web server on one of the following platforms: AIX, HP-UX, Sun Solaris, or Windows NT and Windows 2000. The Web server can provide services to Tivoli Storage Manager servers on AIX, HP-UX, Sun Solaris, Windows NT and Windows 2000, and OS/390 and z/OS™.
Note: You should not install the Web server and Tivoli Storage Manager server on the same machine. To do so would be to lose the performance advantage of using the Web proxy.

- The Web server must have the following:
  - At least 20MB of space to install the base package and the English-language version of the Web proxy help files. If you install other languages, you will need more space.

  Note: The setup and configuration wizard does not check for available disk space.

  - Secure socket layer (SSL) set up.
  - Support for Common Gateway Interface (NT and Windows 2000) 1.0 or later.
  - Support for Java Development Toolkit (JDK) or Java Runtime Environment (JRE) 1.1.6 or later. See "System Requirements" on page 27 for a list of browsers that provide this support.

- After the Web server is installed, note the location of:
  - The web server's cgi-bin directory.
    D:\Apache Group\Apache\cgi-bin
  - The location of the Web server's HTML directory:
    D:\Apache Group\Apache\htdocs
  - The location of the JRE’s base directory:
    C:\Program Files\JavaSoft\JRE

- A Tivoli Storage Manager Secure Web Administrator Proxy CD mounted on your server, or the location of the Web proxy files available via ftp.

- The communication methods set to TCP/IP and HTTP in the Tivoli Storage Manager server options file for each server that you will access.

  Note: The HTTPS communication method, which was required for SSL support under ADSM Version 3, is not required for the Web proxy and is not supported by Tivoli Storage Manager.

### Installing the Secure Web Administrator Proxy - Overview

To install the Secure Web Administrator’s Proxy, you must:

- Set up the Tivoli Storage Manager Server
- Install the Web Administrator Proxy
- Use the Web Administrator Proxy

### Setting Up the Tivoli Storage Manager Server

Do the following on each Tivoli Storage Manager you want to log into with the Web proxy.

1. Ensure that an administrator ID and password that is dedicated to the Web proxy is registered with the Tivoli Storage Manager server. For example, to register administrator PROXY with the password of PROXY, do the following:

   register admin proxy proxy

   Note: Do not grant any authority to the administrator. If you do, the security of your Tivoli Storage Manager system could be compromised.
2. Set the TCP/IP address (high level) and TCP port (low level) addresses of the Tivoli Storage Manager server. For example, to set the TCP/IP address to 9.115.48.123 and the TCP port address to 1500, do the following:

```plaintext
set serverhladdress 9.115.48.123 (TCP/IP address)
set serverlladdress 1500 (TCP port)
```

## Installing the Secure Web Administrator Proxy

The Web proxy files are on a separate CD-ROM, named *Tivoli Storage Manager Secure Web Administrator Proxy*. This CD-ROM is shipped with Tivoli Storage Manager. The CD-ROM also includes HTML versions of all Tivoli Storage Manager server and client publications in a self-extracting zip file. You may also obtain the Web proxy files via the FTP site. The most recent code can be downloaded from ftp://service.boulder.ibm.com/storage/tivoli-storage-management/swap/lookat/readme.download to better understand what files you really need to download. For example, you do not need to download files that will not be installed (like the German (deu) version of the HTML support files).

Follow this procedure to install the Web proxy:

1. On your Web server machine, download the Web proxy files via FTP or CD. Put the files in any directory.

2. In the directory where you put these Web proxy files, set a case-sensitive environment variable which points to the JRE's base directory.

   - **On Windows NT** :
     - Right-click *My Computer* and select *Properties*. Or select *Start*→*Settings*→*Control Panel*→*System*.
     - Select *Environment*.
     - In the *Variables* box, type:
       ```plaintext
       set JAVA_HOME
       ```
     - In the *Value* box, type:
       ```plaintext
       c:\Program Files\Javasoft\jre\1.1
       ```
     - Click *Set*, then *Apply*, then *OK*.

   - **On Windows 2000** :
     - Right-click *My Computer* and select *Properties*→*Advanced*→*Environmental Variables*. Or select *Start*→*Settings*→*Control Panel*→*System*→*Advanced*→*Environmental Variables*.
     - In the *System Variables* box, select the new button.
     - In the *Variables* box, type:
       ```plaintext
       set JAVA_HOME
       ```
     - In the *Value* box, type:
       ```plaintext
       c:\Program Files\Javasoft\jre\1.1
       ```
     - Click *OK*, then *OK*, then *OK*.

3. Open the *http.conf* file in your *\conf* directory and set the *ServerName* to the name of the server. This can be the registered DNS name or the TCPIP address. For example:

   ```plaintext
   xxx.tucson.ibm.com or 9.155.yyy.zzz
   ```

4. The wizard now installs the Web proxy files and completes.
Using the Secure Web Administrator Proxy

1. These next steps to verify if the web proxy was installed correctly depend on the web server being started. To start your web server, consult the documentation that came with the server for more information.

2. Bring up your Web browser.

3. Invoke the proxy by entering the URL that you specified to the wizard. For example:

   http://tsm/cgi-bin/dsmproxy

   If you have set the high and low level server addresses (see 2 on page 111), the login screen of the administrative Web interface is displayed. If you have not specified the addresses, a form is displayed asking for a location.

   **Note:** If you get a web server error: *A network error occurred: unable to connect to server*, one reason may be that your Web server has not been started. Go to the bin directory of your web server:

   **On UNIX:**

   /opt/webserver/bin

   and type:

   webserverctl start

4. Log into your Tivoli Storage Manager with a regular administrative Web interface (not the proxy administrative interface).

Moving to Another Tivoli Storage Manager Server While Using the Web Proxy

1. Make sure the other server is prepared for the Web proxy (see "Setting Up the Tivoli Storage Manager Server" on page 110).

2. Add `?jump` at the end of the CGI URL.

   http://tsm/cgi-bin/dsmproxy ?jump

3. Enter the TCP/IP address and port.

Uninstalling the Secure Web Administrator Proxy

The Web proxy installation puts the uninstall wizard in the same directory as the support file.

- These support files are located in your HTML directory in the `tivoli\tsm\swap\` directory. For example, if your Web server is located at `e:\www\html`, the uninstall wizard will be located in `e:\www\html\tivoli\tsm\swap`.

   To start the uninstall wizard, enter the following case-sensitive command:

   Uninstall

   If you issue this command from the `tivoli\tsm\swap\` directory, the wizard begins removing the files. If you issue this command from any other directory, the wizard prompts you for the location of your HTML directory. The wizard then determines what files were installed and how the Web proxy should be removed.
Troubleshooting the Secure Web Administrator Proxy

- Broken images appear, or requests for help files return a page that states that the page was not found.
  1. Check the permission of the files. The default permission on UNIX is 644, which gives to the owner read-write authority and to all others read-only authority.
  2. Check the Web server error log and verify that the file location is correct. If the file is not at that location, consider adding an Alias to your Web server configuration file. For example, on the Web server the tivoli/lsm/swap/ directory is in /www/tivoli/lsm/swap/. You could fix the problem by adding the following line to httpd.conf:

```
Alias /StorageFiles "/www/StorageFiles"
```

- An initial request returns two errors stating that the Web proxy had an error while connecting to xxx: On your Tivoli Storage Manager console set the server high level and low level addresses. See step 2 on page 111.

- The Web proxy states that the password or ID is invalid: Verify that the Web proxy administrator’s ID and password have been set on the server. You can update the password on the Web proxy using the ?configure option. To use this option, append ?configure to the end of the dsmproxy URL. For example:

```
http://webserver.tucson.ibm.com/cgi-bin/dsmproxy?configure
```

- ?configure or the Web administrative interface links do not work: Set the proxy’s CGI URL to your Web server’s CGI URL. For example:

```
dsmproxy -cgiURL=http://webserver.tucson.ibm.com/cgi-bin
```

- To get to a server other than the default server: Append ?jump to the URL. For example:

```
http://webserver.tucson.ibm.com/cgi-bin/dsmproxy?jump
```

- The Web proxy states that the administrator ID is locked: Unlock the administrator’s ID using the UNLOCK ADMIN command.

- The Web proxy reports an internal error: To turn on tracing on the Web proxy, do one of the following:
  - Append the FORCETRACE option to the Web request. For example, here is a sample Web request:

```
http://webserver.tucson.ibm.com/cgi-bin/dsmproxy?SERVER=tsm:1500&URL=1500
```

To turn tracing on for this request enter FORCETRACE before the server:

```
http://webserver.tucson.ibm.com/cgi-bin/dsmproxy?FORCETRACE&SERVER=tsm:1500&URL=1500
```

The trace information will be placed into a file named proxytrace.txt, which is located in cgi-bin directory of the Web server.

- From the command line, issue the following command in the Web server cgi-bin directory where the dsmproxy was installed:

```
dsmproxy -trace=proxytrc.txt
```

The proxy would then append trace information to the proxytrc.txt file. The trace file name can be any name you choose.
Appendix F. Using Administrative Interfaces

This appendix contains the following sections that describe how to use the Tivoli Storage Manager administrative interfaces:

- "Using the Administrative Web Interface"
- "Using the Administrative Client Command-Line Interface" on page 121

Using the Administrative Web Interface

You can issue Tivoli Storage Manager commands, view server administration data, and perform all administrative tasks directly from the Web interface. For details about starting the Web interface, see "Using TSM Administrative Interfaces" on page 69. To end a Web interface session, select Log Off, from the Options pull down menu.

Note: To use the administrative Web interface, your browser must have Java 1.1.6 support. See "System Requirements" on page 27 for a list of supported browsers.

Tivoli Storage Manager Server Administration has four major views:

- "Operation View" on page 116
- "Network View" on page 118
- "Configuration View" on page 118
- "Object View" on page 118

The following sections contain details about each view.

Figure 26 on page 116 shows the four major views of the Web interface with the Operation view partially expanded.
By default, the time-out interval for an administrative Web interface session is 10 minutes. After the interval elapses, you must reenter your administrator name and password. To change the interval, do the following from the Web interface:

1. Expand the **Operation View**.
2. Expand **Manage Security**.
3. Click **Set web authentication time out**.

Specify an interval from 0 to 9999 minutes. A value of 0 means that the session is never timed out.

---

**Operation View**

<table>
<thead>
<tr>
<th>Work with administrators</th>
<th>Add, update, or delete administrators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grant or revoke administrative privileges</td>
</tr>
<tr>
<td></td>
<td>Grant or revoke administrator authority to access and manage client nodes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Work with client nodes</th>
<th>Add, update, or delete client nodes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lock or unlock client nodes</td>
</tr>
<tr>
<td></td>
<td>Move node data</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Automate client operations</th>
<th>Define, update, or delete client schedules</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Associate client nodes with a schedule</td>
</tr>
<tr>
<td></td>
<td>Remove client nodes from a schedule</td>
</tr>
<tr>
<td></td>
<td>Report on scheduled events</td>
</tr>
<tr>
<td></td>
<td>Tune scheduling settings</td>
</tr>
</tbody>
</table>
| Manage the database and recovery log | View database details  
| Add or remove database volumes  
| Extend or reduce database size  
| Add a copy volume to the database  
| Work with the database space trigger  
| Work with the database backup trigger  
| Back up a database  
| View recovery log details  
| Add or remove recovery log volumes  
| Extend or reduce recovery log size  
| Add a copy volume to the recovery log  
| Work with the recovery log space trigger  
| Set the recovery log mode |

| Manage server storage | Query storage pools  
| Query storage pool volumes  
| Work with disk storage pools:  
| View disk storage pools  
| Define, update, or delete disk storage pools  
| Backup or restore storage pools  
| Define, update, or delete disk storage pool volumes  
| Move data on a storage pool volume  
| Vary a disk volume online or offline  
| Restore a disk storage pool volume  
| Work with sequential access storage pools:  
| View all sequential storage pools  
| Define, update, or delete sequential access storage pools  
| Backup or restore sequential access storage pools  
| Define, update, or delete sequential access volumes  
| Move data on a storage pool volume  
| Restore sequential access storage pool volume  
| Work with copy storage pools:  
| View all copy storage pools  
| Define, update, or delete copy storage pools  
| Define, update, or delete sequential access volumes  
| Move data on a storage pool volume |

| Automate operations | Define, update, activate, deactivate, and delete administrative command schedules  
| View events for administrative schedules  
| Define, update, rename, copy, delete, and run command scripts |

| Monitor operations | Query the server activity log  
| Query client schedule event records  
| View database details  
| View commands issued by administrators  
| View sessions currently accessing the server  
| View processes running on the server |

| Manage security | Set server authentication  
| Modify client registration settings  
| Enable client sessions  
| Disable client sessions  
| Set password expiration, invalid sign-on limit, and minimum password length  
| Set web authentication time out  
| Lock or unlock a node from server access  
| Lock or unlock administrators |

| Performance tuning | Tune client files sent by transaction  
| Tune files or bytes moved by transaction  
| Tune the database buffer pool |
### Central Configuration
- Define or update settings for this server
- Perform configuration manager operations:
  - Establish this server as a configuration manager
  - Work with configuration profiles
  - Notify subscribers of changes
- Perform managed server operations:
  - Define the configuration manager server
  - Set configuration refresh frequency
  - View profiles available for subscription
  - Prepare to subscribe to server information
  - Prepare to subscribe to policy information
  - Work with profile subscriptions

### Network View
<table>
<thead>
<tr>
<th>Other servers</th>
<th>Define, update, delete, export, or import other servers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client Nodes</td>
<td>Register, update, delete, export, or import client nodes</td>
</tr>
<tr>
<td>Server groups</td>
<td>Define, update, delete, or rename server groups</td>
</tr>
<tr>
<td></td>
<td>Define, delete, or move server group members</td>
</tr>
<tr>
<td></td>
<td>Route commands to multiple servers</td>
</tr>
<tr>
<td></td>
<td>Route commands to multiple servers</td>
</tr>
</tbody>
</table>

### Configuration View
<table>
<thead>
<tr>
<th>Define/update settings for this server</th>
<th>Define or update server settings (for example, name, password, or address)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configuration manager operations</td>
<td>Establish this server as a configuration manager</td>
</tr>
<tr>
<td></td>
<td>Work with configuration profiles</td>
</tr>
<tr>
<td></td>
<td>Notify subscribers of changes</td>
</tr>
<tr>
<td>Managed server operations</td>
<td>Define the configuration manager server</td>
</tr>
<tr>
<td></td>
<td>Set configuration refresh frequency</td>
</tr>
<tr>
<td></td>
<td>View profiles available for subscription</td>
</tr>
<tr>
<td></td>
<td>Prepare to subscribe to server information</td>
</tr>
<tr>
<td></td>
<td>Prepare to subscribe to policy information</td>
</tr>
<tr>
<td></td>
<td>Work with profile subscriptions</td>
</tr>
</tbody>
</table>

### Configuration Objects
- Work with configuration settings
- Work with configuration profiles for the following:
  - Managed administrators
  - Managed policy domains
  - Managed command schedules
  - Managed scripts
  - Managed option sets
  - Managed server definitions
  - Managed server groups
  - Subscribers
- Work with profile subscriptions

### Object View
<table>
<thead>
<tr>
<th>Administrators</th>
<th>Register, update, remove, rename, export, import, lock, or unlock administrators</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Grant or revoke administrative privileges</td>
</tr>
<tr>
<td></td>
<td>Grant or revoke administrator authority to access and manage client nodes</td>
</tr>
</tbody>
</table>
### Clients
- Work with client nodes:
  - Register, export, or import client nodes
  - Query occupancy for client nodes
  - Move node data
  - Work with file spaces
  - Work with backup sets
- Work with client option sets:
  - Define client option sets
  - Define client options
  - Work with file spaces
  - Work with backup sets

### Server
- View server status and modify settings
- Work with server options
- View license information, audit and register licenses
- Query activity log
- View or cancel active processes
- View or cancel active sessions
- View or cancel restartable restore sessions
- Query, backup, delete, or update volume history
- View or define other servers
- View or define server groups:
  - View or add server group members
  - Route a command to multiple servers

### Database
- Define database volumes
- Define database copies
- Define, update, or delete the database backup trigger
- Define, update, or delete the database space trigger

### Recovery Log
- Work with the recovery log
- View, define, or delete recovery log volumes
- Define, update, or delete recovery log space trigger

### Automation
- Define, update, rename, copy, delete, and run server command scripts
- Define, update, activate, deactivate, and delete administrative command schedules:
  - View or delete events for administrative schedules
- Define, update, activate, deactivate, and delete client schedules:
  - Define, update, or delete client/schedule associations
  - View or delete events for client schedules
- Define, update, activate, deactivate, and delete immediate actions schedules (one-time processing of client tasks):
  - View or delete events for immediate actions schedules

### Policy Domains
- Define, update, delete, or copy policy domains
- Import or export policy domains
- Move client nodes from one domain to another
- Define, update, delete, or copy policy sets
- Activate or validate policy sets:
  - Define, update, delete, or copy management classes
  - Define, update, or delete copy groups
- Work with client nodes
- Register, export, or import client nodes
- Query occupancy for client nodes
- Move node data:
  - Work with file spaces
  - Work with backup sets
- Define, update, activate, deactivate, and delete client schedules:
  - Define, update, or delete client/schedule associations
  - View or delete events for client schedules
Server Storage

Work with storage pools:
- Work with disk storage pools:
  - View disk storage pools
  - Define, update, or delete disk storage pools
  - Backup or restore storage pools
  - Define, update, or delete disk storage pool volumes
  - Move data on a storage pool volume
  - Vary a disk volume online or offline
  - Restore a disk storage pool volume

Work with sequential access storage pools:
- View all sequential storage pools
- Define, update, or delete sequential access storage pools
- Backup or restore sequential access storage pools
- Define, update, or delete sequential access volumes
- Move data on a storage pool volume
- Restore sequential access storage pool volume

Work with copy storage pools:
- View all copy storage pools
- Define, update, or delete copy storage pools
- Define, update, or delete sequential access volumes
- Move data on a storage pool volume

Query storage pools
Query storage pool volumes

Work with device classes:
- Define, update, or delete device classes
- View defined device classes

Work with libraries and drives:
- Define, update, or delete libraries and drives
- Check-in or label library volumes
- Define, update, or delete NAS data movers
- Define, update, or delete SCSI data movers
- Define, update, or delete tape paths for drives and libraries
- Define, update, or delete disk paths
- Define, update, or delete client/disk associations

Disaster Recovery
Manager

View DRM status and work with DRM settings

Work with DRM machines:
- Define, update, delete, or query DRM machines
- Define, update, or delete DRM node associations
- Define, update, or delete DRM recovery media
- Define, update, or delete DRM media associations

Work with DRM offsite recovery media by current state
Create, update, or delete DRM recovery plan files

---

Using the Administrative Client Command-Line Interface

The administrative client command-line interface lets administrators control and monitor the server through administrative commands. For more information on installing and using the command-line interface, see Administrator’s Reference.

Starting and Stopping the Interface

To enter a series of administrative commands, start the administrative client in interactive mode by entering:

```
dsmadmc
```
You are then prompted to enter your user ID and password. If you do not want to be prompted for that information, you can enter your user ID and password with the DSMADMC command by using the -ID and -PASSWORD options. For example, enter:

```
dsmadmc -id=smith -password=secret
```

To end an administrative client session in interactive mode, use the QUIT command:

```
quit
```
Appendix G. Where to Look for Information

This appendix describes the service that IBM provides for Tivoli Storage Manager and tells you where to look for more information about Tivoli Storage Manager.

Contacting Customer Support

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

- Send e-mail to support@tivoli.com.

Customers in the United States can also call 1-800-TIVOLI8 (1-800-848-6548). For product numbers 5697-TS9, 5697-DRS or 5697-DPM call 1-800-237-5511.

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

You can also review the Customer Support Handbook, which is available on our Web site at http://www.tivoli.com/support/handbook/.

When you contact Tivoli Customer Support, be prepared to provide identification information for your company so that support personnel can readily assist you. Company identification information may also be needed to access various online services available on the Web site.

The support Web site offers extensive information, including a guide to support services (the Customer Support Handbook); frequently asked questions (FAQs); and documentation for all Tivoli products, including Release Notes, Redbooks™, and Whitepapers. The documentation for some product releases is available in both PDF and HTML formats. Translated documents are also available for some product releases.

You can order documentation by e-mail at swdist@tivoli.com. Please provide the publication number, part number, or order number of the desired document. Alternatively, you can provide the document title, version number, and date of publication.

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

- Send e-mail to pubs@tivoli.com.

**Reporting a Problem**

Please have the following information ready when you report a problem:

- The Tivoli Storage Manager server version, release, modification, and service level number. You can get this information by entering the `QUERY STATUS` command at the TSM command line.
- The Tivoli Storage Manager client version, release, modification, and service level number. You can get this information by entering `dsmc` at the command line.
- The communication protocol (for example, TCP/IP), version, and release number you are using.
- The activity you were doing when the problem occurred, listing the steps you followed before the problem occurred.
- The exact text of any error messages.

**Internet**


A newsgroup, `listserv@marist.edu`, is implemented by a third party. IBM supports this newsgroup on a best-effort basis only.

**Tivoli Storage Manager Publications**

The following table lists Tivoli Storage Manager server publications.

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The following table lists Tivoli Storage Manager storage agent publications.

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The following table lists the Tivoli Storage Manager client publications.

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<tbody>
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<td>Tivoli Space Manager for UNIX: Using the Hierarchical Storage Management Clients</td>
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The following table lists Tivoli Data Protection publications.

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<td>Tivoli Data Protection for WebSphere Application Server Installation and User’s Guide</td>
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<tr>
<td>Tivoli Data Protection for Workgroups for NetWare User’s Guide</td>
<td>GC32-0444</td>
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Related IBM Hardware Products Publications

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<tr>
<td>IBM Magstar 3494 Tape Library Introduction and Planning Guide</td>
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<td>IBM Magstar MP 3570 Tape Subsystem Operator’s Guide</td>
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<td>IBM TotalStorage Enterprise Tape System 3590 Operator Guide</td>
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<td>IBM Magstar 3494 Tape Library Dataserver Operator Guide</td>
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IBM Redbooks

The International Technical Support Center (ITSC) publishes redbooks, which are books on specialized topics, such as, Using TSM to Back Up Databases. You can order publications through your IBM representative or the IBM branch office serving your locality. You can also search for and order books of interest to you by visiting the IBM Redbooks home page on the World Wide Web at this address: [http://www.redbooks.ibm.com](http://www.redbooks.ibm.com).

Translations

Selected TSM publications have been translated into languages other than American English. Contact your IBM representative for more information about the translated publications and the availability of these translations in your country.
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<td>Operating System/2</td>
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This glossary may include terms and definitions from:
- The Information Technology Vocabulary, developed by Subcommittee 1, Joint Technical Committee 1, of the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC JTC2/SC1).

A

Absolute mode. A backup copy group mode indicating that specifies that a file is considered for incremental backup even if the file has not changed since the last backup. See also mode. Contrast with modified mode.

Access mode. An attribute of a storage pool or a storage volume that specifies whether the server can write to or read from the storage pool or storage volume. The access mode can be read/write, read-only, or unavailable. Volumes in primary storage pools can also have an access mode of destroyed. Volumes in copy storage pools can also have an access mode of offsite.

Activate. To validate the contents of a policy set and make it the active policy set.

Active policy set. The activated policy set that contains the policy rules currently in use by all client nodes assigned to the policy domain. See also policy domain and policy set.

Active version. The most recent backup copy of a file stored by Tivoli Storage Manager. The active version of a file cannot be deleted until a backup process detects that the user has either replaced the file with a newer version or has deleted the file from the workstation. Contrast with inactive version.

Activity log. A log that records normal activity messages generated by the server. These messages include information about server and client operations, such as the start time of sessions or device I/O errors. Each message includes a message ID, date and time stamp, and a text description. The number of days to retain messages in the activity log can be specified.

Administrative command schedule. A database record that describes the planned processing of an administrative command during a specific time period. See also client schedule.

Administrative privilege class. See privilege class.

Administrative session. A period of time in which an administrator user ID communicates with a server to perform administrative tasks. Contrast with client node session.

Administrator. A user who has been registered to the server. Administrators can be authorized to one or more of the following administrative privilege classes: system, policy, storage, operator, or analyst. Administrators can use the administrative commands and queries allowed by their privileges.

Aggregate file. A file, stored in one or more storage pools, consisting of a group of logical files packaged together. See logical file and physical file.

Analyst privilege class. A privilege class that allows an administrator to reset statistics. See also privilege class.

Application client. One of the Tivoli Data Protection programs installed on a system to protect an application. The Tivoli Storage Manager server provides backup services to an application client.

Archive. To copy one or more files to a storage pool for long-term storage. Archived files can include descriptive information and can be retrieved by archive date, by file name, or by description. Contrast with retrieve.

Archive copy. A file that has been archived to server storage.

Archive copy group. A policy object containing attributes that control the generation, destination, and
expiration of archive copies. An archive copy group belongs to a management class.

**archive retention grace period.** The number of days that Tivoli Storage Manager retains an archive copy when the server is unable to rebind the file to an appropriate management class.

**assigned capacity.** The portion of available space that can be used to store database or recovery log information. See also *available space.*

**association.** (1) The defined relationship between a client node and a client schedule. An association identifies the name of a schedule, the name of the policy domain to which the schedule belongs, and the name of a client node that performs scheduled operations. (2) On a configuration manager, the defined relationship between a profile and an object such as a policy domain. Profile associations define the configuration information that will be distributed to a managed server when it subscribes to the profile.

**audit.** To check for logical inconsistencies between information that the server has and the actual condition of the system. Tivoli Storage Manager can audit volumes, the database, libraries, and licenses. For example, when Tivoli Storage Manager audits a volume, the server checks for inconsistencies between information about backed-up or archived files stored in the database and the actual data associated with each backup version or archive copy in server storage.

**authentication.** The process of checking a user’s password before allowing that user access to the server. Authentication can be turned on or off by an administrator with system privilege.

**authority.** The right granted to a user to perform tasks with Tivoli Storage Manager servers and clients. See also *privilege class.*

**autochanger.** A small, multislot tape device that automatically puts tape cartridges into tape drives. See also *library.*

**available space.** The amount of space, in megabytes, that is available to the database and recovery log. This space can be used to extend the capacity of the database or recovery log, or to provide sufficient free space before a volume is deleted from the database or recovery log.

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

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

**backup retention grace period.** The number of days that Tivoli Storage Manager retains a backup version after the server is unable to rebind the file to an appropriate management class.

**backup set.** A portable, consolidated group of active backup versions of files, generated for a backup-archive client.

**backup version.** A file that a user backed up to server storage. More than one backup version can exist in server storage, but only one backup version is the active version. See also *active version* and *inactive version.*

**binding.** The process of associating a file with a management class name. See *rebinding.*

**buffer pool.** Temporary space used by the server to hold database or recovery log pages. See *database buffer pool* and *recovery log buffer pool.*

**cache.** The process of leaving a duplicate copy on random access media when the server migrates a file to another storage pool in the hierarchy.

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

**client.** A program running on a PC, workstation, file server, LAN server, or mainframe that requests services of another program, called the server. The following types of clients can obtain services from a Tivoli Storage Manager server: administrative client, application client, API client, backup-archive client, and HSM client (also known as Tivoli Space Manager).

**client domain.** The set of drives, file systems, or volumes that the user selects to back up or archive using the backup-archive client.

**client migration.** The process of copying a file from a client node to server storage and replacing the file with a stub file on the client node. The space management attributes in the management class control this migration. See also *space management.*
client node. A file server or workstation on which the backup-archive client program has been installed, and which has been registered to the server.

client node session. A period of time in which a client node communicates with a server to perform backup, restore, archive, retrieve, migrate, or recall requests. Contrast with administrative session.

client options file. A file that a client can change, containing a set of processing options that identify the server, communication method, and options for backup, archive, hierarchical storage management, and scheduling. Also called the dsm.opt file.

client-polling scheduling mode. A client/server communication technique where the client queries the server for work. Contrast with server-prompted scheduling mode.

client schedule. A database record that describes the planned processing of a client operation during a specific time period. The client operation can be a backup, archive, restore, or retrieve operation, a client operating system command, or a macro. See also administrative command schedule.

client system options file. A file, used on UNIX clients, containing a set of processing options that identify the Tivoli Storage Manager servers to be contacted for services. This file also specifies communication methods and options for backup, archive, hierarchical storage management, and scheduling. Also called the dsm.sys file. See also client user options file.

client user options file. A user-created file, used on UNIX clients, containing a set of processing options that identify the server, communication method, backup and archive options, space management options, and scheduling options. Also called the dsm.opt file. See also client system options file.

closed registration. A registration process in which only an administrator can register workstations as client nodes with the server. Contrast with open registration.

collocation. The process of keeping all data belonging to a single client node or a single client file space on a minimal number of sequential-access volumes within a storage pool. Collocation can reduce the number of volumes that must be accessed when a large amount of data must be restored.

compression. The process of saving storage space by eliminating empty fields or unnecessary data in a file. In Tivoli Storage Manager, compression can occur at a workstation before files are backed up or archived to server storage. On some types of tape drives, hardware compression can be used.

configuration manager. One Tivoli Storage Manager server that distributes configuration information to other Tivoli Storage Manager servers (called managed servers) via profiles. Configuration information can include policy and schedules. See managed server and profile.

copy group. A policy object whose attributes control how backup versions or archive copies are generated, where backup versions or archive copies are initially located, and when backup versions or archive copies expire. A copy group belongs to a management class. See also archive copy group, backup copy group, backup version, and management class.

copy storage pool. A named set of volumes that contains copies of files that reside in primary storage pools. Copy storage pools are used only to back up the data stored in primary storage pools. A copy storage pool cannot be a destination for a backup copy group, an archive copy group, or a management class (for space-managed files). See primary storage pool and destination.

D
damaged file. A physical file for which Tivoli Storage Manager has detected read errors.

database. A collection of information about all objects managed by the server, including policy management objects, users and administrators, and client nodes.

database backup series. One full backup of the database, plus up to 32 incremental backups made since that full backup. Each full backup that is run starts a new database backup series. A backup series is identified with a number.

database backup trigger. A set of criteria that defines when and how database backups are run automatically. The criteria determine how often the backup is run, whether the backup is a full or incremental backup, and where the backup is stored.

database buffer pool. Storage that is used as a cache to allow database pages to remain in memory for long periods of time, so that the server can make continuous updates to pages without requiring input or output (I/O) operations from external storage.

database snapshot. A complete backup of the entire Tivoli Storage Manager to media that can be taken off-site. When a database snapshot is created, the current database backup series is not interrupted. A database snapshot cannot have incremental database backups associated with it. See also database backup series. Contrast with full backup.

data mover. A device, defined to Tivoli Storage Manager, that moves data on behalf of the server. A NAS file server can be a data mover.
**default management class.** A management class assigned to a policy set that the server uses to manage backed-up or archived files when a user does not specify a management class for a file.

**desktop client.** The group of backup-archive clients supported by Tivoli Storage Manager that includes clients on Windows, Apple, and Novell NetWare operating systems.

**destination.** A copy group or management class attribute that specifies the primary storage pool to which a client file will be backed up, archived, or migrated.

**device class.** A named set of characteristics applied to a group of storage devices. Each device class has a unique name and represents a device type of disk, file, optical disk, or tape.

**device configuration file.** A file that contains information about defined device classes, and, on some Tivoli Storage Manager servers, defined libraries and drives. The file can be created by using a Tivoli Storage Manager administrative command or by using an option in the server options file. The information is a copy of the device configuration information in the Tivoli Storage Manager database.

**disaster recovery plan.** A file created by Tivoli Disaster Recovery Manager (DRM) that contains information about how to recover computer systems if a disaster occurs and scripts that can be run to perform some recovery tasks. The file includes information about the software and hardware used by the Tivoli Storage Manager server and the location of recovery media.

**domain.** See policy domain or client domain.

**DRM.** A short name for Tivoli Disaster Recovery Manager.

**dsm.opt file.** See client options file and client user options file.

**dsmervopt.** See server options file.

**dsm.sys file.** See client system options file.

**dynamic.** A value for serialization that specifies that Tivoli Storage Manager accepts the first attempt to back up or archive a file regardless of whether the file is modified during the backup or archive process. See also serialization. Contrast with shared dynamic, shared static, and static.

**enterprise configuration.** A method of setting up Tivoli Storage Manager servers so that the administrator can distribute the configuration of one of the servers to the other servers, using server-to-server communication. See configuration manager, managed server, profile, and subscription.

**enterprise logging.** The sending of events from Tivoli Storage Manager servers to a designated event server. The event server routes the events to designated receivers, such as to a user exit. See also event.

**estimated capacity.** The available space, in megabytes, of a storage pool.

**event.** (1) An administrative command or a client operation that is scheduled to be run using Tivoli Storage Manager scheduling. (2) A message that a Tivoli Storage Manager server or client issues. Messages can be logged using Tivoli Storage Manager event logging.

**event record.** A database record that describes actual status and results for events.

**event server.** A server to which other servers can send events for logging. The event server routes the events to any receivers that are enabled for the sending server’s events.

**exclude.** To identify files that you do not want to include in a specific client operation, such as backup or archive. You identify the files in an include-exclude list.

**exclude-exclude list.** See include-exclude list.

**expiration.** The process by which files are identified for deletion because their expiration date or retention period has passed. Backed-up or archived files are marked expired by Tivoli Storage Manager based on the criteria defined in the backup or archive copy group.

**expiration date.** On some Tivoli Storage Manager servers, a device class attribute used to notify tape management systems of the date when Tivoli Storage Manager no longer needs a tape volume. The date is placed in the tape label so that the tape management system does not overwrite the information on the tape volume before the expiration date.

**export.** To copy administrator definitions, client node definitions, policy definitions, server control information, or file data to external media. Used to move or copy information between servers.

**extend.** To increase the portion of available space that can be used to store database or recovery log information. Contrast with reduce.

**F**

**file space.** A logical space in Tivoli Storage Manager server storage that contains a group of files. For clients on Windows systems, a file space is a logical partition that is identified by a volume label. For clients on UNIX systems, a file space is a logical space that
contains a group of files backed up or archived from the same file system, or part of a file system that stems from a virtual mount point. Clients can restore, retrieve, or delete their file spaces from Tivoli Storage Manager server storage. Tivoli Storage Manager does not necessarily store all the files from a single file space together, but can identify all the files in server storage that came from a single file space.

**file space ID (FSID).** A unique numeric identifier that the server assigns to a file space when it is stored in server storage.

**frequency.** A copy group attribute that specifies the minimum interval, in days, between incremental backups.

**FSID.** See file space ID.

**full backup.** The process of backing up the entire server database. A full backup begins a new database backup series. See also database backup series and incremental backup. Contrast with database snapshot.

**fuzzy copy.** A backup version or archive copy of a file that might not accurately reflect what the original content of the file because Tivoli Storage Manager backed up or archived the file while the file was being modified.

**H**

**hierarchical storage management (HSM) client.** The Tivoli Space Manager program that runs on workstations to allow users to maintain free space on their workstations by migrating and recalling files to and from Tivoli Storage Manager storage. Synonymous with space manager client.

**high migration threshold.** A percentage of the storage pool capacity that identifies when the server can start migrating files to the next available storage pool in the hierarchy. Contrast with low migration threshold. See server migration.

**HSM client.** Hierarchical storage management client. Also known as the space manager client.

**I**

**image backup.** A backup of a full file system or raw logical volume as a single object.

**import.** The process of copying exported administrator definitions, client node definitions, policy definitions, server control information or file data from external media to a target server. A subset of information can be imported to a target server from the external media. Used to move or copy information between servers. See export.

**inactive version.** A backup version of a file that is either not the most recent backup version or that is a backup version of a file that no longer exists on the client system. Inactive backup versions are eligible for expiration processing according to the management class assigned to the file. Contrast with active version.

**include-exclude file.** On UNIX and Windows clients, a file containing statements that Tivoli Storage Manager uses to determine whether to include certain files in specific client operations, and to determine the associated management classes to use for backup, archive, and space management. See include-exclude list.

**include-exclude list.** A group of include and exclude option statements that Tivoli Storage Manager uses. The exclude options identify files that are not to be included in specific client operations such as backup or space management. The include options identify files that are exempt from the exclusion rules. The include options can also assign a management class to a file or group of files for backup, archive, or space management services. The include-exclude list for a client may include option statements from the include-exclude file (for UNIX clients) or the client options file (for other clients), and from a client option set on the server.

**incremental backup.** (1) The process of backing up files or directories that are new or have changed since the last incremental backup. See also selective backup. (2) The process of copying only the pages in the database that are new or changed since the last full or incremental backup of the database. Contrast with full backup. See also database backup series.

**L**

**LAN-free data transfer.** The movement of client data directly between a client and a storage device over a SAN, rather than over the LAN.

**library.** (1) A repository for demountable recorded media, such as magnetic tapes. (2) For Tivoli Storage Manager, a collection of one or more drives, and possibly robotic devices (depending on the library type), which can be used to access storage volumes. (3) In the AS/400® system, a system object that serves as a directory to other objects. A library groups related objects, and allows the user to find objects by name.

**library client.** A Tivoli Storage Manager server that uses server-to-server communication to access a library that is managed by another Tivoli Storage Manager server. See also library manager.

**library manager.** A Tivoli Storage Manager server that controls device operations when multiple Tivoli Storage Manager servers share a storage device. The device operations include mount, dismount, volume ownership, and library inventory. See also library client.
logical file. A file stored in one or more server storage pools, either by itself or as part of an aggregate file. See also aggregate file and physical file.

logical occupancy. The amount of space used by logical files in a storage pool. This space does not include the unused space created when logical files are deleted from aggregate files, so it might be less than the physical occupancy. See also physical occupancy, physical file, and logical file.

logical volume. (1) A portion of a physical volume that contains a filesystem. (2) For the Tivoli Storage Manager server, the combined space on all volumes for either the database or the recovery log. The database is one logical volume and the recovery log is one logical volume.

low migration threshold. A percentage of the storage pool capacity that specifies when the server can stop the migration of files to the next storage pool. Contrast with high migration threshold. See server migration.

M

macro file. A file that contains one or more Tivoli Storage Manager administrative commands, which can be run only from an administrative client by using the MACRO command. Contrast with Tivoli Storage Manager command script.

managed object. A definition in the database of a managed server that was distributed to the managed server by a configuration manager. When a managed server subscribes to a profile, all objects associated with that profile become managed objects in the database of the managed server. In general, a managed object cannot be modified locally on the managed server. Objects can include policy, schedules, client options sets, server scripts, administrator registrations, and server and server group definitions.

managed server. A Tivoli Storage Manager server that receives configuration information from a configuration manager via subscription to one or more profiles. Configuration information can include definitions of objects such as policy and schedules. See configuration manager, subscription, and profile.

managed system. A client or server that requests services from the Tivoli Storage Manager server.

management class. A policy object that users can bind to each file to specify how the server manages the file. The management class can contain a backup copy group, an archive copy group, and space management attributes. The copy groups determine how the server manages backup versions or archive copies of the file. The space management attributes determine whether the file is eligible to be migrated by the space manager client to server storage and under what conditions the file is migrated. See also copy group, space manager client, binding, and rebinding.

maximum extension. Specifies the maximum amount of storage space, in megabytes, that you can extend the database or recovery log.

maximum reduction. Specifies the maximum amount of storage space, in megabytes, that you can reduce the database or recovery log.

maximum utilization. The highest percentage of assigned capacity used by the database or recovery log.

migrate. To move data from one storage location to another. See also client migration and server migration.

mirroring. The process of writing the same data to multiple disks at the same time. Mirroring data protects against data loss within the database or recovery log.

mode. A copy group attribute that specifies whether to back up a file that has not been modified since the last time the file was backed up. See modified and absolute.

modified mode. A backup copy group mode that specifies that a file is considered for incremental backup only if it has changed since the last backup. A file is considered changed if the date, size, owner, or permissions have changed. See also mode. Contrast with absolute mode.

mount. To place a data medium (such as a tape cartridge) on a drive in a position to operate.

mount limit. A device class attribute that specifies the maximum number of volumes that can be simultaneously accessed from the same device class. The mount limit determines the maximum number of mount points. See mount point.

mount point. A logical drive through which the server accesses volumes in a sequential access device class. For a removable media device such as tape, a mount point is a logical drive associated with a physical drive. For a device class with the device type of FILE, a mount point is a logical drive associated with an I/O stream. The number of mount points for a device class is determined by the mount limit for that class. See mount limit.

mount retention period. A device class attribute that specifies the maximum number of minutes that the server retains a mounted sequential access media volume that is not being used before it dismounts the sequential access media volume.

mount wait period. A device class attribute that specifies the maximum number of minutes that the server waits for a sequential access volume mount request to be satisfied before canceling the request.
A privilege class that allows an node privilege class.

Systems that make up the cluster.

Microsoft cluster configuration, one of the computer services. See also with a Tivoli Storage Manager server to receive its (1) A workstation or file server that is registered node.

Third-party software on that file server.

NDMP-compliant file server, without installing Manager) to control the backup and recovery of an storage-management application (such as Tivoli Storage industry-standard protocol that allows a network and

Network Data Management Protocol (NDMP). An industry-standard protocol that allows a network storage-management application (such as Tivoli Storage Manager) to control the backup and recovery of an NDMP-compliant file server, without installing third-party software on that file server.

Node. (1) A workstation or file server that is registered with a Tivoli Storage Manager server to receive its services. See also client node and NAS node. (2) In a Microsoft cluster configuration, one of the computer systems that make up the cluster.

Node privilege class. A privilege class that allows an administrator to remotely access backup-archive clients for a specific client node or for all clients in a policy domain. See also privilege class.

Non-native data format. A format of data written to a storage pool that is different from the format that the server uses for basic LAN-based operations. The data is written by a data mover instead of the server. Storage pools with data written in a non-native format may not support some server operations, such as audit of a volume. The NETAPPDUMP data format for NAS node backups is an example of a non-native data format.

Open registration. A registration process in which any users can register their own workstations as client nodes with the server. Contrast with closed registration.

Operator privilege class. A privilege class that allows an administrator to issue commands that disable or halt the server, enable the server, cancel server processes, and manage removable media. See also privilege class.

Page. A unit of space allocation within Tivoli Storage Manager database volumes.

Path. A Tivoli Storage Manager object that defines a one-to-one relationship between a source and a destination. Using the path, the source accesses the destination. Data may flow from the source to the destination, and back. An example of a source is a data mover (such as a NAS file server), and an example of a destination is a tape drive.

Physical file. A file stored in one or more storage pools, consisting of either a single logical file, or a group of logical files packaged together (an aggregate file). See also aggregate file and logical file.

Physical occupancy. The amount of space used by physical files in a storage pool. This space includes the unused space created when logical files are deleted from aggregates. See also physical file, logical file, and logical occupancy.

Policy domain. A policy object that contains policy sets, management classes, and copy groups that are used by a group of client nodes. See policy set, management class, and copy group.

Policy privilege class. A privilege class that allows an administrator to manage policy objects, register client nodes, and schedule client operations for client nodes. Authority can be restricted to certain policy domains. See also privilege class.

Policy set. A policy object that contains a group of management classes that exist for a policy domain. Several policy sets can exist within a policy domain but only one policy set is active at one time. See management class and active policy set.

Premigration. For a space manager client, the process of copying files that are eligible for migration to server storage, while leaving the original file intact on the local system.

Primary storage pool. A named set of volumes that the server uses to store backup versions of files, archive copies of files, and files migrated from HSM client nodes. You can back up a primary storage pool to a copy storage pool. See destination and copy storage pool.

Privilege class. A level of authority granted to an administrator. The privilege class determines which administrative tasks the administrator can perform. For example, an administrator with system privilege class can perform any administrative task. Also called administrative privilege class. See also system privilege class, policy privilege class, storage privilege class, operator privilege class, and analyst privilege class. See also system privilege class, policy privilege class, storage
privilege class, operator privilege class, analyst privilege class, and node privilege class.

profile. A named group of configuration information that can be distributed from a configuration manager when a managed server subscribes. Configuration information can include registered administrators, policy, client schedules, client option sets, administrative schedules, Tivoli Storage Manager command scripts, server definitions, and server group definitions. See configuration manager and managed server.

reclamation. A process of consolidating the remaining data from many sequential access volumes onto fewer new sequential access volumes.

reclamation threshold. The percentage of reclaimable space that a sequential access media volume must have before the server can reclaim the volume. Space becomes reclaimable when files are expired or are deleted. The percentage is set for a storage pool.

recovery log. A log of updates that are about to be written to the database. The log can be used to recover from system and media failures.

recovery log buffer pool. Storage that the server uses to hold new transaction records until they can be written to the recovery log.

reduce. To free up space from the database or recovery log, to allow you to delete a volume. Contrast with extend.

register. (1) To define a client node or administrator who can access the server. See registration. (2) To specify licenses that have been purchased for the server.

registration. The process of identifying a client node or administrator to the server.

R

randomization. The process of distributing schedule start times for different clients within a specified percentage of the schedule’s startup window.

rebinding. The process of associating a backed-up file with a new management class name. For example, rebinding occurs when the management class associated with a file is deleted. See binding.

recall. To access files that have been migrated from workstations to server storage by using the space manager client. Contrast with migrate.

receiver. A server repository that contains a log of server messages and client messages as events. For example, a receiver can be a file exit, a user exit, or the Tivoli Storage Manager server console and activity log. See also event.

restore. To copy information from its backup location to the active storage location for use. In Tivoli Storage Manager, you can restore the server database, storage pools, storage pool volumes, and users’ backed-up files. The backup version in the storage pool is not affected by the restore operation. Contrast with backup.

retention. The amount of time, in days, that inactive backed-up or archived files are kept in the storage pool before they are deleted. Copy group attributes and default retention grace periods for the domain define retention.

retention period. On an MVS server, a device class attribute that specifies how long files are retained on sequential access media. When used, Tivoli Storage Manager passes this information to the MVS operating system to ensure that other tape management systems do not overwrite tape volumes that contain retained data.

retrieve. To copy archived information from the storage pool to the workstation for use. The archive version in the storage pool is not affected by the retrieve operation. Contrast with archive. See also storage pool.

rollback. To remove changes that were made to database files since the last commit point.

S

schedule. A database record that describes scheduled client operations or administrative commands. See administrative command schedule and client schedule.

scheduling mode. The method of interaction between a server and a client for running scheduled operations on the client. Tivoli Storage Manager supports two scheduling modes for client operations: client-polling and server-prompted.

scratch volume. A labeled volume that is either blank or contains no valid data, that is not currently defined to Tivoli Storage Manager, and that is available for use.

script. See Tivoli Storage Manager command script.

selective backup. The process of backing up selected files or directories from a client domain. incremental backup. See also incremental backup.

serialization. The process of handling files that are modified during backup or archive processing. See static, dynamic, shared static, and shared dynamic.

server migration. The process of moving data from one storage pool to the next storage pool defined in the hierarchy, based on the migration thresholds defined for the storage pools. See also high migration threshold and low migration threshold.
**server options file.** A file that contains settings that control various server operations. These settings, or options, affect such things as communications, devices, and performance.

**server-prompted scheduling mode.** A client/server communication technique where the server contacts the client when a scheduled operation needs to be done. Contrast with client-polling scheduling mode.

**server storage.** The primary and copy storage pools used by the server to store users’ files: backup versions, archive copies, and files migrated from Tivoli Space Manager client nodes (space-managed files). See primary storage pool, copy storage pool, storage pool volume, and volume.

**session resource usage.** The amount of wait time, CPU time, and space used or retrieved during a client session.

**shared dynamic.** A value for serialization that specifies that a file must not be backed up or archived if it is being modified during the operation. Tivoli Storage Manager retries the backup or archive operation a number of times; if the file is being modified during each attempt, Tivoli Storage Manager will back up or archive the file on its last try. See also serialization. Contrast with dynamic, shared static, and static.

**shared library.** A library device that is shared among multiple Tivoli Storage Manager servers.

**shared static.** A value for serialization that specifies that a file must not be backed up or archived if it is being modified during the operation. Tivoli Storage Manager retries the backup or archive operation a number of times; if the file is being modified during each attempt, Tivoli Storage Manager will not back up or archive the file. See also serialization. Contrast with dynamic, shared dynamic, and static.

**snapshot.** See database snapshot.

**source server.** A server that can send data, in the form of virtual volumes, to another server. Contrast with target server.

**space-managed file.** A file that is migrated from a client node by the space manager client (HSM client). The space manager client recalls the file to the client node on demand.

**space management.** The process of keeping sufficient free storage space available on a client node by migrating files to server storage. The files are migrated based on criteria defined in management classes to which the files are bound, and the include-exclude list. Synonymous with hierarchical storage management. See also migration.

**space manager client.** The Tivoli Space Manager program that enables users to maintain free space on their workstations by migrating and recalling files to and from server storage. Also called hierarchical storage management (HSM) client.

**startup window.** A time period during which a schedule must be initiated.

**static.** A value for serialization that specifies that a file must not be backed up or archived if it is being modified during the operation. Tivoli Storage Manager does not retry the operation. See also serialization. Contrast with dynamic, shared dynamic, and shared static.

**storage agent.** A program that enables Tivoli Storage Manager to back up and restore client data directly to and from SAN-attached storage.

**storage hierarchy.** A logical ordering of primary storage pools, as defined by an administrator. The ordering is usually based on the speed and capacity of the devices that the storage pools use. In Tivoli Storage Manager, the storage hierarchy is defined by identifying the next storage pool in a storage pool definition. See storage pool.

**storage pool.** A named set of storage volumes that is the destination that the Tivoli Storage Manager server uses to store client data. The client data consists of backup versions, archive copies, and migrated files. You can back up a primary storage pool to a copy storage pool. See primary storage pool and copy storage pool.

**storage pool volume.** A volume that has been assigned to a storage pool. See volume, copy storage pool, and primary storage pool.

**storage privilege class.** A privilege class that allows an administrator to control how storage resources for the server are allocated and used, such as monitoring the database, recovery log, and server storage. Authority can be restricted to certain storage pools. See also privilege class.

**stub file.** A file that replaces the original file on a client node when the file is migrated from the client node to server storage by Tivoli Space Manager.

**subscription.** The method by which a managed server requests that it receive configuration information associated with a particular profile on a configuration manager. See managed server, configuration manager, and profile.

**system privilege class.** A privilege class that allows an administrator to issue all server commands. See also privilege class.
tape library. A term used to refer to a collection of drives and tape cartridges. The tape library may be an automated device that performs tape cartridge mounts and demounts without operator intervention.

tape volume prefix. A device class attribute that is the high-level-qualifier of the file name or the data set name in the standard tape label.

target server. A server that can receive data sent from another server. Contrast with source server. See also virtual volumes.

Tivoli Disaster Recovery Manager (DRM). A product that works with Tivoli Storage Manager to assist in preparing and later using a disaster recovery plan file for the Tivoli Storage Manager server.

Tivoli Storage Manager command script. A sequence of Tivoli Storage Manager administrative commands that are stored in the Tivoli Storage Manager server database. You can run the script from any interface to the server. The script can include substitution for command parameters and conditional logic.

UCS-2. An ISO/IEC 10646 encoding form, Universal Character Set coded in 2 octets. The Tivoli Storage Manager client on Windows NT and Windows 2000 uses the UCS-2 code page when the client is enabled for Unicode.

Unicode Standard. A universal character encoding standard that supports the interchange, processing, and display of text that is written in any of the languages of the modern world. It can also support many classical and historical texts and is continually being expanded. The Unicode Standard is compatible with ISO/IEC 10646. For more information, see http://www.unicode.org.


validate. To check a policy set for conditions that can cause problems if that policy set becomes the active policy set. For example, the validation process checks whether the policy set contains a default management class.

version. A backup copy of a file stored in server storage. The most recent backup copy of a file is the active version. Earlier copies of the same file are inactive versions. The number of versions retained by the server is determined by the copy group attributes in the management class.

virtual volume. An archive file on a target server that represents a sequential media volume to a source server.

volume. The basic unit of storage for the Tivoli Storage Manager database, recovery log, and storage pools. A volume can be an LVM logical volume, a standard file system file, a tape cartridge, or an optical cartridge. Each volume is identified by a unique volume identifier. See database volume, scratch volume, and storage pool volume.

volume history file. A file that contains information about: volumes used for database backups and database dumps; volumes used for export of administrator, node, policy, or server data; and sequential access storage pool volumes that have been added, reused, or deleted. The information is a copy of the same types of volume information in the Tivoli Storage Manager database.
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