IBM Tivoli Storage Manager
for OS/390 and z/OS

Quick Start

Version 5 Release 2
Quick Start

Version 5 Release 2

This edition applies to Version 5 Release 2 of IBM Tivoli Storage Manager for OS/390 and z/OS (program numbers 5698-ISM, 5697-ISM, 5698-ISX, 5698-SAN, and 5698-HSM) and to any subsequent releases until otherwise indicated in new editions.

Order publications through your IBM sales representative or the branch office that serves your locality.

Your comments are important to help us provide the most accurate, quality information. If you have comments about this book or any other IBM Tivoli Storage Manager documentation, please see “Contacting Customer Support” on page 125.

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Summary of Changes for IBM Tivoli Storage Manager Version 5

This section summarizes changes that have been made to the IBM Tivoli Storage Manager product.

Technical Changes for Version 5 Release 2—April 2003

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

LAN-Free Data Movement
Tivoli Storage Manager supports LAN-free data movement in storage area network (SAN) environments. The support allows client data to move directly from the client system to a server-managed storage device on the SAN. This enhancement reduces data movement on the LAN so that more bandwidth is available to other applications.

See Administrator’s Guide for more information.

Security: Firewall Support
Tivoli Storage Manager has enhanced support for environments with firewalls in which communication originating from outside the firewall is to be restricted. Clients normally contact the server, but with the new firewall support, you can choose to restrict session initiation to the server. Scheduled, backup-archive client operations can be restricted to server-initiated sessions.

See Administrator’s Guide and Quick Start for more information.

See the following new server options:
TCPADMINPORT
ICSADMINPORT

See the following changed server options:
TCPPORT
ICSPORT

Reclamation Enhancements
See Quick Start for more information.

Macintosh OS X Unicode Support for Backup-Archive Client
Unicode filesystems are now supported on the Macintosh client. By supporting a Unicode-enabled client, the Tivoli Storage Manager server can store file spaces with Unicode file space names, directory names, and file names. The client can successfully process a Tivoli Storage Manager operation even when the file spaces contain directory names or files in multiple languages, or when the client uses a different code page from the server.

See Administrator’s Guide for more information.

Increased Archive Retention Limits
Tivoli Storage Manager now supports increased retention times for archives and backup sets. These new retention values will allow data archives to be kept longer.

See Administrator’s Guide for more information.
Server to Server Export and Import

Tivoli Storage Manager server export and import processing has been enhanced to support the following functions:

- Direct server export to server import over the TCP/IP communications line between two servers of the same or differing platforms, which eliminates the need for compatible sequential device types between servers to perform data movement.
- Merging of imported data into existing client file spaces on the server.
- Ability to export client file data based on a date and time specification, which allows server-to-server export and import operations to maintain duplicate copies of client data on two or more servers.

See Administrator’s Guide for more information.

Server Performance Tuning

The maximum value of the server option TXNGROUPMAX has been increased. When transferring multiple small files, increasing the TXNGROUPMAX option can improve throughput for operations to tape. It is now possible to set the TXNGROUPMAX option for individual clients.

See Administrator’s Guide for more information.

Communication Method

Tivoli Storage Manager no longer supports the COMMMETHOD values PDMCONNECT, PDMPORT, or PDMNAME. The COMMMETHOD server option has been updated to reflect this change.

Licensing Changes

The Websphere Application Server has been added. Managed System for SAN is now supported.

Product packaging and name changes

The following table lists changes to product packaging and names for IBM Tivoli Storage Manager. See www.ibm.com/software/tivoli/solutions/storage/ for complete details.

<table>
<thead>
<tr>
<th>Former name</th>
<th>Current name or term</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tivoli Disaster Recovery Manager</td>
<td>disaster recovery manager (DRM)</td>
<td>This product is now part of IBM Tivoli Storage Manager Extended Edition.</td>
</tr>
<tr>
<td>Tivoli Storage Manager Managed System for SAN</td>
<td>IBM Tivoli Storage Manager for Storage Area Networks</td>
<td>This product includes LAN-free data movement and library sharing on SANs.</td>
</tr>
<tr>
<td>Tivoli Space Manager</td>
<td>IBM Tivoli Storage Manager for Space Management</td>
<td>The client is called space manager or HSM client.</td>
</tr>
</tbody>
</table>
Table 1. Product Packaging and Name Changes (continued)

<table>
<thead>
<tr>
<th>Former name</th>
<th>Current name or term</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tivoli Data Protection</td>
<td>One of the following:</td>
<td>See the Web site for details.</td>
</tr>
<tr>
<td>products</td>
<td>IBM Tivoli Storage Manager for Application Servers</td>
<td>The clients are frequently called <em>application clients</em> in the</td>
</tr>
<tr>
<td></td>
<td>IBM Tivoli Storage Manager for Databases</td>
<td>product information.</td>
</tr>
<tr>
<td></td>
<td>IBM Tivoli Storage Manager for Enterprise Resource Planning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IBM Tivoli Storage Manager for Hardware</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IBM Tivoli Storage Manager for Mail</td>
<td></td>
</tr>
</tbody>
</table>

Changes for Version 5 Release 1—March 2002

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

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
IBM 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.
Before You Begin

IBM Tivoli Storage Manager provides automated, policy-based storage management for file servers and workstations. This publication helps you install and configure a practical system. It explains how to:

- Define the communication network for server and clients
- Configure IBM Tivoli Storage Manager for your environment

What You Should Know First

Before using this publication, you should be familiar with:

- OS/390 and z/OS operating systems
- Devices that Tivoli Storage Manager can use
- Workstation operating systems on which the clients reside
- Communication protocols installed on your client and server machines

IBM Tivoli Storage Manager Web Site

All Tivoli Storage Manager publications are available from the Tivoli Storage Manager home page on the World Wide Web at this address:


By accessing the Tivoli Storage Manager home page, you can access subjects that interest you. You can also keep up-to-date with the newest Tivoli Storage Manager product information.

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 IBM Tivoli Storage Manager:

- Server and client command line interfaces provide comprehensive control of Tivoli Storage Manager via 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.

Conventions Used in This Book

This section describes the conventions used in this book.

Types of Information

The following conventions help you to identify types of information:

- Important tips or cautions
Where Tasks Are Performed
The following conventions identify where to perform the associated tasks:

- **OS/390 and z/OS:** OS/390 and z/OS MODIFY command
- **ADMIN:** Administrative client command line
- **web:** Administrative web interface
- **cli:** End user client command line
- **gui:** End user client graphical user interface

Installation and Setup Results

After you complete the tasks in Chapter 2, “Setting Up IBM Tivoli Storage Manager”, on page 17, the default IBM Tivoli Storage Manager system will consist of the following:

**Database**
Sized for your system. The size of log, database, and storage pool volumes is for a new install only. If you have a previous version of Tivoli Storage Manager installed, a migrate install will occur and the new version will use the previously defined log, database, and storage pool volumes.

**Recovery Log**
Sized for your system.

**Disk Storage Pools**
The following disk storage pools are sized for your system:
- BACKUPPOOL
- ARCHIVEPOOL
- SPACEMGPOOL

**Standard policy**
Objects for a default storage policy are defined (all are named STANDARD). This policy specifies the following:
- When a backed up file is no longer associated with a backup copy group, it remains in server storage for 30 days.
- When an archived file is no longer associated with an archive copy group, it remains in server storage for 365 days.
- Client files are not space managed.
- For backup operations:
Files are backed up to the default disk storage pool, BACKUPPOOL.

An incremental backup is performed only if the file has changed since the last backup.

Files cannot be backed up while they are being modified.

Up to two backup versions of a file on the client’s system are retained in server storage. The most recent backup version is retained for as long as the original file is on the client file system. All other versions are retained for up to 30 days.

One backup version of a file that has been deleted from the client’s system is retained in server storage for 60 days.

For archive operations:

Files are archived in the default disk storage pool, ARCHIVEPOOL.

Files cannot be archived while they are being modified.

An archive copy is kept for up to 365 days.

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**Basic Tasks**

Here is an overview of the tasks of installing and customizing IBM Tivoli Storage Manager, with pointers to the details of the procedures:

1. **Installing the server** (see IBM Tivoli Storage Manager Program Directory and Chapter 2, “Setting Up IBM Tivoli Storage Manager”, on page 17)
2. **Registering an Administrator** on page 29
3.  
4.  
5.  
6. Chapter 4, “Customizing Your IBM Tivoli Storage Manager System”, on page 97
   a. “Defining Storage Pool Volumes” on page 97
   b.  
   c. “Using Tape Devices with IBM Tivoli Storage Manager” on page 99
   d. “Creating a New Policy” on page 103
   e. “Automating Client Operations” on page 106
   f. “Automating Administrative Commands” on page 107

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**Advanced Tasks**

To take full advantage of IBM Tivoli Storage Manager, you may want to perform other tasks described in the Administrator’s Guide, including the following:

**Network of servers**
Create a network of 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

**Server and storage pool protection**
- Mirror your database and recovery log
- Back up your database and storage pools
- Recover lost or damaged database and storage pool data

**Storage Pools and Volumes**
- Back up your storage pools
- Move files from one volume to another
**Storage Policies**
- Provide clients on some platforms with space management services
- Provide additional functions to backup and archive services

**Security**
- Let clients access IBM Tivoli Storage Manager without requiring passwords
- Modify the password expiration interval
- Assign levels of administrator authority
- Specify the minimum password length
- Force a client or administrator to change the password

**Server Operations**
Monitor and control:
- Server processes
- Client sessions
- Tivoli Storage Manager activity log
- Tivoli Storage Manager accounting records
- Logging facilities used to monitor server activity
Chapter 1. Introducing IBM Tivoli Storage Manager

IBM 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 Tivoli Storage Manager include:

**Backup and Restore:**
The backup process creates a copy of the file or application data that can be recovered if the original data is lost or destroyed. Unlike other backup applications, Tivoli Storage Manager implements a *progressive backup methodology* to move data quickly and reliably. Using progressive backup, the number of file versions maintained by Tivoli Storage Manager 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 Tivoli Storage Manager client interface, or performed remotely using a Web-based interface.

The restore process transfers a backup data copy from Tivoli Storage Manager 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 Tivoli Storage Manager 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:**
IBM Tivoli Storage Manager allows for the creation of a complete set of client files, called a *backup set*, on the Tivoli Storage Manager 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.

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

**Space Manager Client:**
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 Tivoli Storage Manager 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.
Tivoli Storage Manager Architecture

IBM Tivoli Storage Manager is implemented as a client/server software application. Tivoli Storage Manager uses policies to manage the movement of data between clients, servers, and storage devices. Table 2 lists the two primary Tivoli Storage Manager components.

Table 2. Primary Tivoli Storage Manager Components

<table>
<thead>
<tr>
<th>Component</th>
<th>For more information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tivoli Storage Manager Server</td>
<td>Refer to “Tivoli Storage Manager Server Overview”</td>
</tr>
<tr>
<td>Tivoli Storage Manager Client</td>
<td>Refer to “Tivoli Storage Manager Client Overview” on page 4</td>
</tr>
</tbody>
</table>

Tivoli Storage Manager Server Overview

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

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

The Tivoli Storage Manager 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.

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

Tivoli Storage Manager 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 Tivoli Storage Manager data management scenario might look something like this:

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

The next scheduled incremental backup of the workstation runs Tuesday evening.
   The Tivoli Storage Manager 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. Tivoli Storage Manager 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 Tivoli Storage Manager 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. Tivoli Storage Manager will maintain its copy of this file indefinitely.

During expiration processing, the Tivoli Storage Manager 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 Tivoli Storage Manager 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 Tivoli Storage Manager. Refer to the Tivoli Storage Manager Web site at www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html for a complete list of supported storage devices.

During ongoing Tivoli Storage Manager operation, expired files are automatically deleted from storage media, causing volumes to become fragmented. When an administrator-defined threshold of available space is reached, Tivoli Storage Manager 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.

Tivoli Storage Manager also provides an external library manager interface, which allows you to integrate Tivoli Storage Manager into third-party storage management environments. Refer to the Administrator’s Guide for more information.

**Server Customization**
Tivoli Storage Manager server operational parameters, including communications and performance settings, are defined in a server options file located in the server
directory. Tivoli Storage Manager sets default values for many of the options during the initial configuration process. You can modify default options using a text editor. Refer to the Administrator’s Guide and Administrator’s Reference for more information about server options.

Tivoli Storage Manager server run-time settings are defined in the Tivoli Storage Manager server database. These include security, accounting, and activity log settings. Tivoli Storage Manager provides default values for these settings when the Tivoli Storage Manager 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.

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

Tivoli Storage Manager Client Overview
The Tivoli Storage Manager client component sends data to, and retrieves data from, a Tivoli Storage Manager server. The Tivoli Storage Manager client must be installed on every machine that will transfer data to server-managed storage. The Tivoli Storage Manager server uses a unique node name to identify each Tivoli Storage Manager client instance. A password can be used to authenticate communications between the Tivoli Storage Manager 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 Tivoli Storage Manager 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 Tivoli Storage Manager 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. Tivoli Storage Manager will back up any file not specifically excluded. Refer to Backup-Archive Clients Installation and User’s Guide for more information.

Some client options can also be defined in the Tivoli Storage Manager 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 Tivoli Storage Manager clients available on a wide variety of platforms. The following list provides a brief description of some common Tivoli Storage Manager clients. For more detailed information, including installation and management instructions, refer to Backup-Archive Clients Installation and User’s Guide.
Backup-archive Client
The backup-archive client provides standard Tivoli Storage Manager 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 Tivoli Storage Manager server command line, which can be used to remotely manage a Tivoli Storage Manager server from a network-attached machine. The administrative Web interface is also commonly referred to as a Tivoli Storage Manager administrative client.

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

Tivoli Storage Manager data protection
The Tivoli Storage Manager data protection client, also called an application client, allows for the backup and restoration of data used by various business applications. The Tivoli Storage Manager data protection client receives backup and restore requests from the business application and translates them for Tivoli Storage Manager server processing. Backup and restore processing can be done while the business application is on line. Refer to the Tivoli Storage Manager data protection documentation set for more information.

Space Manager Client
The Space Manager client, also called a Hierarchical Storage Management (HSM) client, transparently migrates data from the client hard drive to Tivoli Storage Manager 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 Tivoli Storage Manager server. End users can also explicitly migrate and recall data. HSM client function is fully integrated with Tivoli Storage Manager operational backup and archive functions.

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

How Tivoli Storage Manager Works
Tivoli Storage Manager is a highly flexible and scalable product that provides the capability for fully managed storage. With Tivoli Storage Manager’s extensive functionality, however, comes a certain amount of complexity. It is important to take the time to learn and understand the Tivoli Storage Manager approach to storage management. Tivoli Storage Manager 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 Tivoli Storage Manager product model, with an emphasis on its unique features. Table 3 on page 6 describes the two interrelated discussions that make up the product model overview.
Table 3. Tivoli Storage Manager Product Model Overview Topics

<table>
<thead>
<tr>
<th>Overview topic</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>&quot;Data Management&quot;</td>
<td>This section compares the Tivoli Storage Manager progressive backup methodology with other common approaches. Tivoli Storage Manager data management policy objects are also described.</td>
</tr>
<tr>
<td>&quot;Storage Device and Media Management&quot; on page 10</td>
<td>This section describes Tivoli Storage Manager storage policy objects. Tivoli Storage Manager tape rotation, storage hierarchy, and data migration are also described. The storage pool, a fundamental Tivoli Storage Manager management object, is described in some detail.</td>
</tr>
</tbody>
</table>

Data Management

The main difference between the data management approach of Tivoli Storage Manager and other commonly used systems is that Tivoli Storage Manager 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 Tivoli Storage Manager to implement its unique backup methodology.

Common Backup Methodologies

Most backup products offer some variation of the three backup methodologies described in Table 4.

Table 4. 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>
</tbody>
</table>
| Full + incremental backup | - Full backups are done on a regular basis, for example, weekly  
- In between Full backups, regular Incremental backups copy only files that have changed since the last backup | - Less data is regularly moved than in a Full backup. Only the latest incremental copy is restored. |
Table 4. Common Backup Methodologies (continued)

<table>
<thead>
<tr>
<th>Common Backup Methodology</th>
<th>How it Works</th>
<th>Drawbacks</th>
</tr>
</thead>
</table>
| Full + differential backup | • Full backups are done on a regular basis, for example, weekly  
 • In between Full backups, Differential backups copy only files that have changed since last Full backup | • Better restore performance than in a Full + Incremental backup. A differential will back up more data because it ignores differentials that were taken between the previous full and the current differential. |

You are probably familiar with one or more of these approaches. Before Tivoli Storage Manager, 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, IBM 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 Tivoli Storage Manager database, the progressive backup methodology reduces the potential for human error and helps enforce your storage management procedures. Table 5 describes the progressive backup methodology.

Table 5. Tivoli Storage Manager Progressive Backup Methodology

<table>
<thead>
<tr>
<th>Tivoli Storage Manager 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 Tivoli Storage Manager 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  
 • Tivoli Storage Manager 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 |

Tivoli Storage Manager 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 and client nodes.
- You can create a portable backup set from Tivoli Storage Manager server storage,
  which can be copied to media and used to perform a LAN-free restore of a
  client system.

In any implementation, the Tivoli Storage Manager 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 Tivoli Storage Manager 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 Tivoli Storage
Manager backup, rules define how many versions of a file should be kept and
where they should be stored.

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

Tivoli Storage Manager 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 Tivoli Storage Manager data management policy
objects is to look at how they can reflect the organizational structure of your
business environment. Table 6 introduces the Tivoli Storage Manager data
management policy hierarchy, and provides examples of how you can use these
policy objects to achieve your administrative goals:

<table>
<thead>
<tr>
<th>Tivoli Storage Manager Policy Object</th>
<th>Organizational Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy Domain</td>
<td>You could map to different categories of Tivoli Storage Manager 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>
</tbody>
</table>
Table 6. Tivoli Storage Manager Data Management Policy (continued)

<table>
<thead>
<tr>
<th>Tivoli Storage Manager Policy Object</th>
<th>Organizational Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy Set</td>
<td>You could use policy sets to create subsets of Tivoli Storage Manager 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>You could map to different categories of data generated by your Tivoli Storage Manager 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 Tivoli Storage Manager 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>
<tr>
<td>Copy Group</td>
<td>The working elements of Tivoli Storage Manager policy are defined in copy groups. These elements include the number of versions of Tivoli Storage Manager client files to be maintained and the amount of time those files will be stored. The other Tivoli Storage Manager 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 Tivoli Storage Manager client nodes associated with this domain will be managed according to these specifications.</td>
</tr>
</tbody>
</table>

Figure 1 on page 10 shows how Tivoli Storage Manager uses these policy objects to manage client data.
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.

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.

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.

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, Tivoli Storage Manager implements several logical entities to classify the available storage resources. Table 7 on page 11 describes the Tivoli Storage Manager media and device policy set.
Table 7. Tivoli Storage Manager Storage Device and Media Policy

<table>
<thead>
<tr>
<th>Tivoli Storage Manager Policy Object</th>
<th>What it Represents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
<td>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.</td>
</tr>
<tr>
<td>Storage Pool</td>
<td>Represents a collection of available storage volumes of the same media type. Tivoli Storage Manager 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 3590tape device class consists of a number of 3590 tape volumes. Clients that need to back up data directly to 3590 tape are associated with this storage pool. Other client data might go first to a DISK storage pool, and then migrate to the 3590 storage pool. Each storage pool is associated with a single device class.</td>
</tr>
<tr>
<td>Device Class</td>
<td>Represents the type of storage device that can use the volumes defined to a given storage pool. For example, an 3590 tape device class can be used to associate a storage pool with any library device that handles 3590 tape. Each removable media-type device class is associated with a single library.</td>
</tr>
<tr>
<td>Library</td>
<td>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. The library object is only for purposes of implementing LAN-free data movement.</td>
</tr>
</tbody>
</table>

Storage Hierarchy and Data Migration
The storage pool is the central element of the Tivoli Storage Manager storage management environment because it provides the link between Tivoli Storage Manager data and storage objects. Tivoli Storage Manager allows you to organize storage pools into one or more hierarchical structures. Each storage hierarchy can span multiple Tivoli Storage Manager 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 the Administrator’s Guide for more information.

Tape Rotation
By providing policy objects that focus your management effort on data instead of media, Tivoli Storage Manager 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 Tivoli Storage Manager, can be thought of as the ongoing automated circulation of media through the storage management process. Once Tivoli Storage Manager selects an available tape, the tape is used and eventually reclaimed according to its associated policy.
Policy-based storage management takes a little time 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, Tivoli Storage Manager storage management objects, and Tivoli Storage Manager data management objects.

When a Tivoli Storage Manager client is registered, it is associated with a policy domain. The other Tivoli Storage Manager policy objects are defined within the policy domain.

When the Tivoli Storage Manager 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 Tivoli Storage Manager 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 Tivoli Storage Manager Operations

You can define schedules to automate Tivoli Storage Manager 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 **Tivoli Storage Manager server operations**, you only need to create a schedule or set of schedules on the Tivoli Storage Manager server.

To schedule **Tivoli Storage Manager client operations**, you need to do two things:
- Create a schedule or set of schedules on the Tivoli Storage Manager server
- Install and start a scheduler component on the Tivoli Storage Manager client machine

Any of the following storage management tasks can be automated:
- Backup and restore
- Archive and retrieve
- Tivoli Storage Manager 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 Tivoli Storage Manager client machine. This is done with a wizard accessed from the backup-archive client graphical interface. Refer to *Backup-Archive Clients Installation and User’s Guide* for more information.
Where to Go From Here

Basic Storage Management Tasks
This publication is primarily intended to help you do the following:
1. Install and configure Tivoli Storage Manager.
2. Set up client/server communications.
3. Customize your Tivoli Storage Manager installation.

Additional information and instructions are also provided, including the following:
- Using administrative interfaces
- Setting up the Secure Web Administrator Proxy
- Tape processing considerations
- National language support
- Applying maintenance updates
- Removing Tivoli Storage Manager

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:

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 Tivoli Storage Manager 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 IBM 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 IBM 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. Tivoli Storage Manager provides functions to help you configure, manage, and monitor the servers connected to a network consistently and efficiently.

Tivoli Storage Manager 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. See “Registering IBM Tivoli Storage Manager Licenses” on page 32.
Chapter 2. Setting Up IBM Tivoli Storage Manager

See the IBM Tivoli Storage Manager Program Directory for code installation. This chapter describes the following tasks:

<table>
<thead>
<tr>
<th>Task:</th>
<th>Procedure:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Migrate IBM Tivoli Storage Manager from a previous licensed version to Version 5.2</td>
<td>“Migrating to IBM Tivoli Storage Manager Version 5.2” on page 19</td>
</tr>
<tr>
<td>Setting Up IBM Tivoli Storage Manager for the first time</td>
<td>“Implementing the IBM Tivoli Storage Manager Server Program (First Time Installation)” on page 21</td>
</tr>
<tr>
<td>Set up the server</td>
<td>“Getting Started” on page 28</td>
</tr>
</tbody>
</table>

When you install IBM Tivoli Storage Manager, the following are available:

- IBM Tivoli Storage Manager server
- One administrative client, named SERVER_CONSOLE

See "Installation and Setup Results” on page x for details about the results of the installation.

System Requirements

For requirements, supported devices, client code, and fixes, go to the Tivoli Storage Manager Web site at [www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html](http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html).

After you have installed IBM Tivoli Storage Manager and before you begin to customize it for your use, go to the Tivoli Storage Manager Web site. Download and apply any applicable fixes.

The IBM Tivoli Storage Manager Administrative Web Interface, Web Proxy, and Web Client Interface require a Java Swing-capable Web browser with Java Runtime Environment (JRE) 1.3.1 installed. Web browsers that meet these requirements include:

- Netscape Navigator 6.0 (which provides Java Swing support) or later
- Netscape Navigator 4.7 or later with the Java Plug-In (JRE 1.3.1)
- Microsoft Internet Explorer 5.0 or later with the Java Plug-In (JRE 1.3.1)

If your browser meets these requirements but does not correctly display a Tivoli Storage Manager Web-based interface, consider trying a different browser.

Information Required for Using IBM Tivoli Storage Manager

This section describes the JCL, data sets, and time coordination used with IBM Tivoli Storage Manager.

Using ASAMPLIB for Installation

IBM Tivoli Storage Manager provides sample JCL in the ASAMPLIB data set that you can modify to help you prepare the server. The following members are available:
ANRALLO1
Allocates and formats the required server data sets.

ANRALLO2
Allocates and formats the required server data sets instead of ANRALLO1 if the SMS address space has been started. ANRALLO2 requires less modification than ANRALLO1.

ANRIDL
Loads the Tivoli Storage Manager database with interface definitions used by the administrative web interface.

ANRINST
Initializes the Tivoli Storage Manager server database and recovery log.

ANRSMP0P
Contains a sample server options file.

ANRSTART/ANRPROC
Starts and runs the Tivoli Storage Manager server in normal mode after it has been installed and initialized.

ASAMPLIB also contains other members that can help you complete other tasks after installation is complete. These members include:

ANRFMT
Allocates and formats a new Tivoli Storage Manager VSAM linear data set. Also extends the database and recovery log or creates new storage pool volumes. See Administrator’s Guide for details.

ANRFMT2
Allocates and formats a new Tivoli Storage Manager VSAM linear data set instead of ANRFMT if the SMS address space is active. ANRFMT2 requires less modification than ANRFMT. See Administrator’s Guide for details.

ANRLEVEL
Determines the level of SVM available on your system.

ANRSIVP
Contains Tivoli Storage Manager commands for installation verification. See “Verifying Your Server Installation” on page 34.

ANRUSRXA
Contains assembler DSECT that defines the user exit buffer and the record written by the file exit.

ANRUSRXC
Contains a sample user exit for event logging (written in C).

ANRUSRXH
Contains a sample C definition of the user exit buffer and the record written by the file exit.

ANRUSRXS
Contains a sample user exit for event logging (written in Assembler).

ANSCLIST
Contains a sample TSO CLIST for starting a TSO administrative client. See “Configuring TSO Administrative Client Using APPC” on page 70.

ANSPROC
Contains a sample TSO procedure for starting a TSO administrator client. See “Configuring TSO Administrative Client Using APPC” on page 70.
Region Size for your IBM Tivoli Storage Manager Server

A region size of 256MB (REGION=256M) is recommended for starting the IBM Tivoli Storage Manager server. However, this value can be decreased or increased based on server workload. To determine the optimum value for your installation, monitor server operation and set the region size according to the results.

If the specified region is too small, server performance can be significantly impacted, especially during periods of high server activity. For example, the operating system GETMAIN and FREEMAIN processing can have a major impact on the performance of transaction-oriented applications such as IBM Tivoli Storage Manager. To eliminate or minimize GETMAIN and FREEMAIN calls, the server uses its own method for satisfying storage requests. The ability of the server to avoid calls to the GETMAIN and FREEMAIN procedures is highly dependent on adequate region size for the workload.

When increasing the region size, use 128MB increments until the desired performance is achieved, or until it is clear that the additional storage is yielding improved performance. Once this occurs, you can reduce the region size in small increments (for example, 32 MB), to determine the optimum region size for your workload. It is important that performance be monitored for a period of time and over periods of high activity.

If the desired performance is not achieved after adjusting the region size, consult the IBM Tivoli Storage Manager documentation and Redbooks for performance-related options and suggestions.

A region size of 0M (REGION=0M) is not recommended. Specifying 0M will result in poor server performance.

Migrating to IBM Tivoli Storage Manager Version 5.2

If you have previously used disaster recovery manager (DRM) to create a disaster recovery plan file, that file refers to names that may no longer be valid. After you have installed IBM Tivoli Storage Manager, 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, see the "Using disaster recovery manager" chapter in the Administrator's Guide.

Use this procedure if you already have a previous version of IBM Tivoli Storage Manager installed and you have:

- Database, recovery log, and disk storage pool volumes initialized and defined
- One or more administrative clients installed and registered
- Backup-archive clients installed and registered

Do the following:

1. Use the BACKUP DB command to dump the contents of the server database to tape. For example:

```bash
backup db devclass=cartridge scratch=yes
```
2. Store the output volumes in a safe location. These volumes will be needed to restore your database to the pre-5.2 level of the IBM Tivoli Storage Manager server. If you need to restore the database to the pre-5.2 level of the server, call the IBM® support center for assistance.

3. Install IBM Tivoli Storage Manager Version 5.2. Use the IBM Tivoli Storage Manager Program Directory.

4. Update your current server options file if necessary. See Administrator’s Reference for the Version 5.2 options.

5. Ensure that the REGION parameter on the JCL that is used to start the Tivoli Storage Manager server (ANRSTART) is set to at least 256MB (REGION=256M). See “Region Size for your IBM Tivoli Storage Manager Server” on page 19.

6. Include or modify the IMAGES DD statement for the administrative web interface image files in the ANRSTART job. For example,

   ```
   //IMAGES DD DSN=TIVSM.SANRIMG(WEBSERV2),DISP=SHR
   ```

7. Upgrade your database to the IBM Tivoli Storage Manager Version 5.2 level. Specify the UPGRADEDB parameter in the EXEC statement of the Tivoli Storage Manager server startup up job ANRSTART. For example,

   ```
   //SERVER EXEC PGM=DSMSERV,DYNAMNBR=300,PARM='/UPGRADEDB'
   ```

8. Start the server by submitting the IBM Tivoli Storage Manager server startup job with the UPGRADEDB parameter.

9. Wait until the server is operational. (When operational, the server displays a message saying that initialization is complete, and the Tivoli Storage Manager command prompt appears.) Then stop the server using the HALT command:

   ```
   halt
   ```

10. Remove PARM='/UPGRADEDB' from the EXEC statement of the server startup job. The upgrade must be done only once.

11. To use the administrative web interface, modify and then run the ANRIDL job from ASAMPLIB. Here is an example of an ANRIDL job:

   ```
   //TIVSM JOB MSGLEVEL=(1,1)
   //   REGION=256M,TIME=10,CLASS=A,MSGCLASS=H
   // *---------------------------------------------------------------------*
   // * This sample JOB loads the server database with Interface Definitions that are used for the WEB Administrative Interface. *
   // *---------------------------------------------------------------------*
   //SERVER EXEC PGM=DSMSERV,PARM="/RUNFILE DD:IDL",DYNAMNBR=300
   //OPT DD DSN=TIVSM.ANRSERV.OPTIONS,DISP=MOD
   //DSMAMENG DD DSN=TIVSM.SANRMSG(ANRMENU),DISP=SHR
   //HLPAMENG DD DSN=TIVSM.SANRHLP(ANRHENU),DISP=SHR
   //IDL DD DSN=TIVSM.SANRIMG(ANRIDL),DISP=SHR
   //DSK DD DSN=TIVSM.DISKLOG,DISP=SHR
   //SYSPRINT DD SYSOUT=* 
   //SYSTERM DD SYSOUT=* 
   ```

   Figure 3. Example of Modified ANRIDL Job

   After IDL initialization completes, the server halts.
12. Tivoli Storage Manager is shipped with sample command scripts that can be loaded into the database and run from an administrative client or an administrative web interface. They can also be included in Tivoli Storage Manager administrative command schedules. The sample scripts, in the ANRSCRPT member of the ASAMPLIB dataset, are primarily SELECT queries, but also include scripts that define volumes and extend the database and recovery log and that backup storage pools. To load the sample scripts into the database, run the following job:

```plaintext
//TIVSM JOB MSGLEVEL=(1,1)
// REGION=256M,TIME=10,CLASS=A,MSGCLASS=H
//*********************************************************
//* This sample JOB loads the server database with sample
//* server SCRIPTs.                                     *
//*********************************************************
//SERVER EXEC PGM=DSMSERV,PARM="/RUNFILE DD:SCRIPT",DYNAMNBR=300
//OPT DD DSN=TIVSM.ANRSERV.OPTIONS,DISP=MOD
//DSMMENG DD DSN=TIVSM.SANRMSG(ANRMENU),DISP=SHR
//HLPAMENG DD DSN=TIVSM.SANRHLP(ANRHENU),DISP=SHR
//SCRIPT DD DSN=TIVSM.SAMPLIB(ANRSCRPT),DISP=SHR
//DSK DD DSN=TIVSM.DISKLOG,DISP=SHR
//SYSPRINT DD SYSOUT=*  
//SYSTERM DD SYSOUT=*  
```

**Note:** The sample scripts could have been loaded when a previous version of IBM Tivoli Storage Manager was installed. Loading the sample scripts again at this point will overlay any existing scripts of the same name and any modifications made to those scripts will be lost.

13. Restart the server.

---

**Implementing the IBM Tivoli Storage Manager Server Program (First Time Installation)**

If you are installing IBM Tivoli Storage Manager for the first time, perform the steps in this section and then continue at “Getting Started” on page 28.

**Allocating the Required Server Data Sets**

**Note:** To help you prepare your IBM Tivoli Storage Manager server, jobs ANRALLO1 and ANRALLO2 are available from the ASAMPLIB dataset. Modify the jobs as necessary.

ANRALLO2 requires that ANRFMT2 be modified as necessary and be placed in a procedure library (for example, SYS1.PROCLIB).

The server does not support VSAM Extended Format Linear Data sets. The server supports VSAM Linear Datasets that have been defined at 4GB or less.

At a minimum, you should allocate and format the following data sets:
TIVSM.DISKLOG
Holds the data set names for the virtual storage access method (VSAM) linear data sets used by the server

TIVSM.RCVRYLOG
Recovery log volume

TIVSM.DB1
Database volume

TIVSM.STORAGE.POOL001
Storage pool volume for backed up files

TIVSM.STORAGE.POOL002
Storage pool volume for archived files

TIVSM.STORAGE.POOL003
Storage pool volume (required only for the space management feature)

TIVSM.ANRSERV.OPTIONS
Server options file

To allocate these data sets (except for the TIVSM.DISKLOG data set) run the ANRALLO1 or ANRALLO2 job after modifying them to meet your needs. The TIVSM.DISKLOG is allocated in the ANRINST job later in the server installation process. See “Initializing the Server Database and Recovery Log Volume” on page 25.

If the SMS address space is not active, you must use the ANRALLO1 job. If the SMS address space is active you can use the ANRALLO2 job, which requires less modification.

Allocating Using the ANRALLO1 Job
Before running this job, modify the JCL statements as follows:

• Customize the job card for your installation.
• For the OPTIONS DD statement, assign a volume for the VOL=SER= parameter.
• For each of the VSAM data sets to be allocated (such as TIVSM.RCVRYLOG and TIVSM.DB1), specify the size of the data set with the MB(_) parameter in the DEFINE CLUSTER statement.

You can, as an alternative, use the allocations provided by the ANRALLO1 job. These initial allocations are enough to run the server for the first time. Later, when you start to implement storage management policies for your client workstations, you can increase the size of the database, recovery log, and storage pools while the server is running.

• For each VSAM data set assign a volume serial in the DEFINE CLUSTER statement.

Figure 4 on page 23 is a modified allocation example for the Tivoli Storage Manager server data sets. In this example, we allocate and format three storage pool data sets. If you are not implementing the space management feature on the server, you only need to allocate and format two storage pool data sets.
//ANRALLO1 JOB ,
// MSGLEVEL=(1,1),MSGCLASS=H,CLASS=A,REGION=40M,TIME=1440
//*
//***************************************************************************
//* Allocate TSM server files:
//* Options file
//****************************************************************************
//* ALLOOPT EXEC PGM=IEFBR14
//OPTIONS DD DSN=TIVSM.ANRSERV.OPTIONS,DISP=(NEW,CATLG),
// DCB=(RECFM=FB,BLKSIZE=6240,LRECL=80),SPACE=(TRK,(1,1)),
// UNIT=3390,VOL=SER=TIVSM3
//***************************************************************************
//* Recovery log volume:
//***************************************************************************
//* allocate TIVSM.RCVRYLOG
//* ALLOLOG EXEC PGM=IDCAMS
//* SYSPRINT DD SYSOUT=* 
//* SYSIN DD *
//* DEFINE CLUSTER( NAME(TIVSM.RCVRYLOG) LINEAR MB(13) VOL(TIVSM1) ) 
//* format TIVSM.RCVRYLOG
//* FMTLOG EXEC PGM=DSMFMT,DYNAMNBR=300,COND=(0,NE,ALLOLOG),
//* PARM='/TIVSM.RCVRYLOG'
//* DSMAMENG DD DSN=TIVSM.SANRMSG(ANRMENU),DISP=SHR
//* SYSPRINT DD SYSOUT=* 
//* SYSTERM DD SYSOUT=* 
//***************************************************************************
//* Database volume:
//***************************************************************************
//* allocate TIVSM.DB1
//* ALLODB1 EXEC PGM=IDCAMS 
//* SYSPRINT DD SYSOUT=* 
//* SYSIN DD *
//* DEFINE CLUSTER( NAME(TIVSM.DB1) LINEAR MB(21) VOL(TIVSM2) ) 
//* format TIVSM.DB1
//* FMTDB1 EXEC PGM=DSMFMT,DYNAMNBR=300,COND=(0,NE,ALLODB1),
//* PARM='/TIVSM.DB1'
//* DSMAMENG DD DSN=TIVSM.SANRMSG(ANRMENU),DISP=SHR
//* SYSPRINT DD SYSOUT=* 
//* SYSTERM DD SYSOUT=* 
//***************************************************************************
//* Storage pool volumes:
//***************************************************************************
//* allocate TIVSM.STORAGE.POOL001
//* ALLOPL1 EXEC PGM=IDCAMS 
//* SYSPRINT DD SYSOUT=* 
//* SYSIN DD *
//* DEFINE CLUSTER( NAME(TIVSM.STORAGE.POOL001) LINEAR MB(320) VOL(TIVSM3) ) 
//* format TIVSM.STORAGE.POOL001
//* FMTPL1 EXEC PGM=DSMFMT,DYNAMNBR=300,COND=(0,NE,ALLOPL1),
//* PARM='/TIVSM.STORAGE.POOL001'
//* DSMAMENG DD DSN=TIVSM.SANRMSG(ANRMENU),DISP=SHR
//* SYSPRINT DD SYSOUT=* 
//* SYSTERM DD SYSOUT=* 

Figure 4. Example of Modified ANRALLO1 Job (Part 1 of 2)
Allocating Using the ANRALLO2 Job
If the SMS address space is active and the ANRFMT2 procedure has been copied to a procedure library, you can use the ANRALLO2 job instead of the ANRALLO1 job to allocate and format the required server data sets. For information about the ANRALLO2 job, see Administrator’s Guide. ANRALLO2 requires less modification than ANRALLO1.

Figure 4. Example of Modified ANRALLO1 Job (Part 2 of 2)

Allocating Using the ANRALLO2 Job
If the SMS address space is active and the ANRFMT2 procedure has been copied to a procedure library, you can use the ANRALLO2 job instead of the ANRALLO1 job to allocate and format the required server data sets. For information about the ANRFMT2 job, see Administrator’s Guide. ANRALLO2 requires less modification than ANRALLO1.

Figure 5 on page 25 is an example of an ANRALLO2 job that allocates and formats the same data sets that are allocated and formatted by the ANRALLO1 job in Figure 4 on page 23.
Initializing the Server Database and Recovery Log Volume

In this procedure, Tivoli Storage Manager prepares the disk log, recovery log, and database for normal use.

Before the Tivoli Storage Manager server can be started for normal operations, the database and recovery log volumes must be initialized. Use the sample job ANRINST from the ASAMPLIB dataset for this step. Modify ANRINST as necessary.

To indicate that initialization is required, you must specify the FORMAT parameter in the PARM keyword of the EXEC statement. Specify the PARM parameter:

```
PARM='/FORMAT <recovery log file spec> <database file spec>'
```

where:

---

**Figure 5. Example of Modified ANRALLO2 Job**

## Initializing the Server Database and Recovery Log Volume

In this procedure, Tivoli Storage Manager prepares the disk log, recovery log, and database for normal use.

Before the Tivoli Storage Manager server can be started for normal operations, the database and recovery log volumes must be initialized. Use the sample job ANRINST from the ASAMPLIB dataset for this step. Modify ANRINST as necessary.

To indicate that initialization is required, you must specify the FORMAT parameter in the PARM keyword of the EXEC statement. Specify the PARM parameter:

```
PARM='/FORMAT <recovery log file spec> <database file spec>'
```

where:
<recovery log file spec> is the number of recovery log files followed by the names of the recovery log files (<number of files><recovery log file_1 ... recovery log file_n>)

<database file spec> is the number of database files followed by the names of the database files (<number of files><database file_1 ... database file_n>)

The following example specifies one recovery log file (TIVSM.RCVRYLOG) and one database file (TIVSM.DB1):

```parmline
PARM='/FORMAT 1 TIVSM.RCVRYLOG 1 TIVSM.DB1'
```

The PARM keyword can be continued on multiple statements by continuing the data in column 16 of each statement. The limit is 100 characters. For example:

```parmline
//TIVSMINST EXEC PGM=DSMSERV,DYNAMNBR=300,
   PARM='/FORMAT 1 TIVSM.SRV1.RCVRYLOG 1 TIVSM.SRV1.DB1'
```

Figure 6 is a sample ANRINST job after it has been updated:

```parmline
//ANRINST JOB MSGLEVEL=1,
//   REGION=160M,TIME=10,CLASS=A,MSGCLASS=H
//SERVER EXEC PGM=DSMSERV,DYNAMNBR=300,
   PARM='/FORMAT 1 TIVSM.RCVRYLOG 1 TIVSM.DB1'
//OPT DD DSN=TIVSM.ANRSERV.OPTIONS,DISP=SHR
//DSMAMENG DD DSN=TIVSM.SANRMSG(ANRMENU),DISP=SHR
```
Communication Method | Server Options
---|---
TCP/IP | TCPPORT, TCPNAME and TCPADMINPORT
3270 or APPC (LU 6.2) | LUNAME
IUCV | IUCV
TCPaccess | ICSPORT, ICSSNAME and ICSADMINPORT
TCPaccess HTTP | HTTPICSPORT
TCP/IP HTTP | HTTPTCPPORT

See Chapter 3, “Server and Client Communications”, on page 39 for information about configuring server and client communications. After you have completed the client-server communication configuration, go to the next section.

Setting the DEVCONFIG and VOLUMEHISTORY Options
We recommend that you set the DEVCONFIG and VOLUMEHISTORY options at this time. These options are important in the recovery of your database if it is destroyed or unavailable.

The DEVCONFIG option specifies the name of a data set in which Tivoli Storage Manager stores a backup copy of device configuration information. The VOLUMEHISTORY option specifies the name of a data set in which Tivoli Storage Manager stores a copy of volume history information. For example, specify TIVSM.DEVCONF1.DATA for the DEVCONFIG option and TIVSM.SERV1.DATA for the VOLUMEHISTORY option. You do not have to allocate the data sets.

You can specify the DEVCONFIG and VOLUMEHISTORY options multiple times to keep more than one backup file of device configuration and volume history information. Each time you specify them, use a different data set name.

For details about the DEVCONFIG and VOLUMEHISTORY options, see Administrator’s Reference. For information about Tivoli Storage Manager database backup and recovery features, see Administrator’s Guide.

Starting the Server for Normal Operation
Modify the ANRSTART job from the ASAMPLIB dataset to meet your needs. You can modify:

- The job card parameters
- Any DD statements necessary to refer to libraries required by IBM Tivoli Storage Manager.

For example, the server requires an LE runtime library to be available at server startup. If the runtime library is not part of your link library list, specify the library on a STEPLIB DD statement in ANRSTART.

- See “Region Size for your IBM Tivoli Storage Manager Server” on page 19

Figure 7 on page 28 is an example of a modified ANRSTART job with a STEPLIB DD statement for the runtime library SYS1.SCEERUN and TIVSM.LINKLIB.
Submit the job to start the server. When operational, the server displays a message saying that initialization is complete, and the Tivoli Storage Manager prompt displays.

**Note:** To start the server as a procedure, update ANRPROC from the ASAMPLIB dataset and install it on a system procedure library (for example, SYS1.PROCLIB).

**Getting Started**

This section describes the following tasks:
- “Registering an Administrator” on page 29
- “Starting an Administrative Client” on page 29
- “Stopping the Server” on page 32
- “Registering IBM Tivoli Storage Manager Licenses” on page 32
- “Registering Backup-Archive Client Nodes” on page 34
- “Verifying Your Server Installation” on page 34

You can perform most of the tasks mentioned in this section from either an administrative command line or web interface. See Appendix A, “Using Administrative Interfaces”, on page 109 for details about each.

All of the administrative commands in this book are shown as issued from an administrative command line. The commands can also be issued with the MVS™ MODIFY command as in the example shown here:

```
f server,command
```

**server** The name of the JOB under which the Tivoli Storage Manager server is running. For example, TIVSM is the name of the job started in Figure 7.

**command** A Tivoli Storage Manager command.
Registering an Administrator

You must register an administrator before you can perform the tasks that follow in this section. Using the MVS MODIFY command, register the administrator ADMIN with the password ADMIN. Then give ADMIN the highest authority level, SYSTEM. For details about the other authority levels, see the Tivoli Storage Manager Administrator’s Reference.

```
f server,register admin admin admin
f server,grant authority admin classes=system
```

`server` The name of the JOB under which the Tivoli Storage Manager server is running. For example, TIVSM is the name of the job started in Figure 7 on page 28.

Changing the Administrative Client Password

If you wish, you can change the password of administrator ADMIN at this point. To change the password to TUCSON, for example, do the following:

```
update admin admin tucson
```

OR

1. Select Administrators.
2. Select the desired administrator name.
3. From Operations, select Update an Administrator.
4. Enter the administrator information and Finish.

Refer to Tivoli Storage Manager Administrator’s Reference for the command syntax and the minimum number of characters that can be specified.

Starting an Administrative Client

The Tivoli Storage Manager server must be running before any client can connect.

Notes:

1. The Tivoli Storage Manager server must be running before any client can connect.
2. The communications method that an administrative client uses to connect to the Tivoli Storage Manager server must be defined in the server options file. See “Specifying Server Communication Options” on page 26.
3. The client options file must be prepared with the appropriate communications method and related options. Refer to Backup-Archive Clients Installation and User’s Guide.

This section describes how to start the TSO administrative client and the web interface. Follow the instructions under “Starting the TSO Administrative Client” on page 30 to start the TSO client and follow the instructions under “Starting the Administrative Web Interface” on page 31 to start the web interface.

For information on starting all other clients, refer to Backup-Archive Clients Installation and User’s Guide.
When you start the administrative client, you must enter an administrator name and password. The administrator ADMIN with a password of ADMIN was defined earlier and should be used.

Start an administrative client session in command line mode by entering this command on your workstation:

```
dsmadm -id=admin -password=admin
```

**Starting the TSO Administrative Client**

The ANSPROC member of the ASAMPLIB dataset contains a sample TSO logon procedure for the TSO administrative client. Create or modify this logon procedure and make it available to the TSO user ID that will be used to administer IBM Tivoli Storage Manager. Figure 8 is an example of a modified logon procedure.

```
 PROC 0
 PROFILE PROMPT
 CONTROL NOCLIST MSG FLUSH PROMPT
 /* it is important to include the parameter "PROMPT" */
 /* in the PROFILE and CONTROL statements to allow */
 /* DSMADM (TSO Admin Client module) to prompt for */
 /* input (e.g. PASSWORD). */
 ALLOC F(DSOCOPT) DA('TIVSM.TSOADMIN.OPTIONS') SHR REUSE
 ALLOC F(DSCLANG) DA('TIVSM.SANSMSG(ANSMENU)') SHR REUSE
 CALL 'SYS1.LINKLIB(DSMADM)'
 FREE F(DSOCOPT DSCLANG )
```

**Figure 8. Example of Modified TSO Administrative Client Logon Procedure**

As an alternative to using the ANSPROC member to start the TSO administrative client, you can use the ANSCLIST CLIST procedure from the ASAMPLIB dataset by modifying it and adding it to your CLIST library. Figure 9 shows the ANSCLIST CLIST procedure.

```
//DSMADM EXEC PGM=IKJEFT01,TIME=1440,REGION=32M,DUNAMNBR=200
// PARM='SPFPROF'
//DSOCOPT DD DSN=TIVSM.TSOADMIN.OPTIONS,DISP=SHR
//DSCLANG DD DSN=TIVSM.SANSMSG(ANSMENU),DISP=SHR
//SYSUADS DD DSN=SYS1.UADS,DISP=SHR
//SYSELDL DD DSN=SYS1.ISRCLIB,DISP=SHR
// SYSPROC DD DSN=SYS1.HRFCLST,DISP=SHR
// DD DSN=SYS1.SBLSCLIB,DISP=SHR
// DD DSN=SYS1.ISRCLLIB,DISP=SHR
...
//SYSPRINT DD TERM=TS
//SYSIN DD TERM=TS
```

**Figure 9. Example of ANSCLIST Procedure from ASAMPLIB**

**TSO Client Option File Setup**

The ANSSMPOP member of the ASAMPLIB dataset contains a sample client options file. Allocate a sequential data set and copy ANSSMPOP from the ASAMPLIB dataset to the allocated data set. The name of the data set must be specified in the DSOCOPT DD statement. The options shown here are the only...
options that you are required to update. For a complete list of client options, refer to the Backup-Archive Clients Installation and User’s Guide.

The TSO administrative client can communicate with a Tivoli Storage Manager server in one of four communication methods:

- IBM TCP/IP
- TCPaccess via IBM TCP/IP
- IBM APPC/MVS
- IBM IUCV

The desired communication method must be specified in the client options file prior to starting the TSO administrative client. Refer to Administrator’s Reference for a complete description of the options and the parameters that you can specify.

### IBM TCP/IP

<table>
<thead>
<tr>
<th>COMMETHOD</th>
<th>TCP/IP</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCPSERVERADDRESS</td>
<td>tcp_address</td>
</tr>
<tr>
<td>TCPPORT</td>
<td>port#</td>
</tr>
</tbody>
</table>

### IBM APPC/MVS (SNA LU6.2)

<table>
<thead>
<tr>
<th>COMMMETHOD</th>
<th>SNALU6.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYMBOLICDESTINATION</td>
<td>applid</td>
</tr>
</tbody>
</table>

### IBM IUCV

<table>
<thead>
<tr>
<th>COMMMETHOD</th>
<th>IUCV</th>
</tr>
</thead>
<tbody>
<tr>
<td>SERVERNAME</td>
<td>job_name</td>
</tr>
</tbody>
</table>

If you used the ANSPROC member of the ASAMPLIB dataset for the TSO administrative client, enter the following command at the TSO prompt:

dsmadmcmd

If you used the CLIST procedure and you named it **tsadmcmd**, enter the following at the TSO prompt:

tsmadm

### Starting the Administrative Web Interface

Before starting the administrative web interface, ensure that you have submitted the ANRIDL job from the ASAMPLIB dataset on the server machine. See Figure 3 on page 20 for an example of the ANRIDL job. This job loads the web interface definition file.

**Note:** If you will be using the administrative web interface, your browser must have Java™ 1.1.6 support. See “System Requirements” on page 17

To start the web interface, enter the URL on a web browser on your client workstation:

http://server_name:1580
server_name
Is the IP address (name, dotted name, or dotted number - for example, server1 or 9.115.2.15) of the IBM Tivoli Storage Manager server you want to contact.

1580 Is the value specified in either the server option HTTPTCPPort or HTTPICSPort. The default is 1580.

To end an administrative client session do one of the following:

quit

OR

From Options, select Log Off

Stopping the Server
You can stop the server without warning if an unexpected problem occurs. To avoid severely affecting administrative and client node activity, stop the server only after current administrative and client node sessions have completed or been 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:

halt

OR

1. Select Server.
2. Select Server Status.
3. Select Halt Server and then Yes.

This shuts down the server immediately and cancels all client sessions, even if activity has not completed.

Registering IBM Tivoli Storage Manager Licenses
The base IBM Tivoli Storage Manager license includes an unlimited number of administrative clients and one backup-archive client. When you install IBM Tivoli Storage Manager, each server license you order must be specified with a LICENSE option in the server options file. For example, to license disaster recovery manager and 25 backup-archive clients, adding the following options to the server options file:

license drm
license managedsyslan number 25
**Note:** Tivoli Storage Manager requires one Managed System for LAN license for each Tivoli Storage Manager application client.

The licensed option keywords are:

<table>
<thead>
<tr>
<th>License File Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOMINOAPPL</td>
<td>To license each managed system that uses IBM Tivoli Storage Manager for Mail (Lotus® Domino™).</td>
</tr>
<tr>
<td>DRM</td>
<td>To license IBM Tivoli Storage Manager Extended Edition</td>
</tr>
<tr>
<td>EMCSYMMETRIXR3APPL</td>
<td>To license each managed system that uses IBM Tivoli Storage Manager for Hardware (EMC Symmetrix R/3).</td>
</tr>
<tr>
<td>ESSAPPL</td>
<td>To license each managed system that uses IBM Tivoli Storage Manager for Hardware (ESS).</td>
</tr>
<tr>
<td>ESSR3APPL</td>
<td>To license each managed system that uses IBM Tivoli Storage Manager for Hardware (ESS R/3).</td>
</tr>
<tr>
<td>INFORMIXAPPL</td>
<td>To license each managed system that uses IBM Tivoli Storage Manager for Databases (Informix®).</td>
</tr>
<tr>
<td>LOTUSNOTESAPPL</td>
<td>To license each managed system that uses IBM Tivoli Storage Manager for Lotus Notes™.</td>
</tr>
</tbody>
</table>
| MANAGEDSYSLAN     | To license Managed System for LAN. IBM Tivoli Storage Manager requires one license for each managed system (client) that moves data to and from storage over a LAN. IBM Tivoli Storage Manager also requires one Managed System for LAN license for each of the following licenses:  
  - Tivoli Storage Manager for Space Management. IBM Tivoli Storage Manager requires only one Managed System for LAN license if an HSM client and backup-archive client are on the same system with the same node ID.  
  - Tivoli Storage Manager data protection. |
| MANAGEDSYSSAN     | To license Managed System for SAN. Tivoli Storage Manager requires this license for each managed system that moves data to and from storage over a storage area network (SAN). |
| MSEXCHANGEAPPL    | To license each managed system that uses IBM Tivoli Storage Manager for Mail (MS Exchange). |
| MSSQLAPPL         | To license each managed system that uses IBM Tivoli Storage Manager for Databases (MS SQL Server). |
| ORACLEAPPL        | To license each managed system that uses IBM Tivoli Storage Manager for Databases (Oracle). |
| R3APPL            | To license each managed system that uses IBM Tivoli Storage Manager for Enterprise Resource Planning (R/3). |
| SPACEMGMT         | To license Tivoli Storage Manager for Space Management (HSM clients). |
| WASAPPL           | To license each managed system that uses IBM Tivoli Storage Manager for Application Servers (WebSphere). |

**Notes:**

1. You can also obtain licenses for features and register those licenses by specifying these keywords in the LICENSE server option.

2. The REGISTER LICENSE command adds license statements to the server options file. The OPT DD card in the server startup JCL must include the DISP=MOD parameter.
3. The server options file must be a physical sequential (PS) data set.

See Tivoli Storage Manager Administrator’s Guide and Tivoli Storage Manager Administrator’s Reference for additional license information.

Also, the REGISTER LICENSE command can be used to register licenses dynamically. Besides activating a license, a LICENSE statement will be added to the server options file. To allow the server to update the server options file dynamically:

- The server options file must be defined as a physical sequential (PS) dataset
- The DISP=MOD parameter (not DISP=SHR) must be specified in the OPT DD statement of the server startup JOB

For example, to register the license for space management enter the following command:

```
register license spacemgmt
```

OR

1. Select Server.
2. Select License Information.
3. From Operations, select Register License.
4. Enter the required information and Finish.

Registering Backup-Archive Client Nodes

You are now ready to register backup-archive clients. For example, to register a node named MERCEDES with the password MONTANA, do the following:

```
register node mercedes montana
```

OR

1. Select Clients.
2. Select Client Nodes.
3. From Operations, select Register a New Node.
4. Enter the node information and Finish.


Verifying Your Server Installation

This section describes how to verify the initial configuration by backing up and restoring client data. The section also describes how to archive and retrieve client data.
Note: The example shown in this section is for a Windows 32-bit backup-archive client.

You can use the ANRSIVP member in the ASAMPLIB dataset as a checklist to verify that you have completed all the steps necessary to successfully install the server. Perform this step from an MVS operator or system console. The following are queries contained in the ANRSIVP member and the expected results if you have successfully completed all the required installation steps.

**Q OPTION**
Displays information about your server options.

**Q STATUS**
Displays information about your server parameters.

**Q STGPOOL**
Displays information about your backup and archive storage pools.

**Q VOLUME**
Displays information about your storage pool volumes.

**Q DB**  Displays allocation information about the Tivoli Storage Manager database.

**Q DBV**
Displays information about database volumes.

**Q LICENSE**
Displays licensing information.

**Q LOG**
Displays allocation information about the recovery log.

**Q LOGVOLUME**
Displays information about the recovery log volumes.

**Q DOMAIN**
Displays information about policy domains.

**Q MGMTCLASS**
Displays information about management classes.

**Q COPYGROUP**
Displays information about backup and archive copy groups.

**Before You Perform a Backup**
Before you perform a backup, you will need to do the following:

1. Ensure that you have registered your clients and have set up the configuration file.
2. Install the IBM Tivoli Storage Manager client software on each remote workstation.
3. Configure the communications options in the client options file to connect with the server.

**Backing Up a Client**

**Using an Include-Exclude Options File to Control Processing:** 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. This can also apply to any other files that you could easily rebuild.
You can use the options in the include-exclude options file to exclude certain files from backup processing. The options apply for both incremental and selective backups. IBM 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 you have excluded. For more information on creating an include-exclude options file, see the Backup-Archive Clients Installation and User’s Guide.

Do the following to backup a client:
1. To start the backup-archive client GUI, click on the client icon:
   Enter the registered node name and password.

   Use the following steps to backup several files:
2. Click Backup from the Tivoli Storage Manager window. The Backup window appears.
3. Expand the directory tree. Select the folder icons to display the files in the directory. Choose the selection boxes next to the files or directories you want to back up.
4. Choose the backup type:
   • For an incremental backup (by either date only or complete), click Incremental.
     
     Note: The first backup of a file is always a full backup, even if you specify Incremental.
   • For a selective backup, click Always backup.
5. Click Backup. The Backup Status window displays the backup processing status.

Restoring IBM Tivoli Storage Manager Client Files
This section explains the procedure used to perform a simple restore of client files. For details and advanced procedures, see the Backup-Archive Clients Installation and User’s Guide.

Restoring Files or Directories: An administrator can determine how many backup versions are kept for each file. Keeping multiple versions of files allows a user to restore an older version if their most recent backup is damaged.

IBM Tivoli Storage Manager refers to the most recent backup version as the active version. The most recent backup version is considered an inactive version if the file was deleted or excluded at the client and an incremental backup was run. Any other backup version is considered an 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.

Every time IBM Tivoli Storage Manager backs up your files, it marks the new backup version as the active backup. It also changes the previous active backup to an inactive backup. When the maximum number of inactive versions is reached, the oldest inactive version is deleted.

• To restore an inactive backup version:
  Click Display active/inactive files from the View menu on the Tivoli Storage Manager window.
  • To restore an active backup version:
Click **Display active files only** from the **View** menu on the Tivoli Storage Manager window.

**Restoring files or subdirectories:** To restore backup versions of individual files or subdirectories:
1. Click **Restore** from the Tivoli Storage Manager window. The **Restore** window opens.
2. Expand the directory tree. Select the selection boxes next to the files or directories you want to restore.
3. Click **Restore**. The **Restore Destination** window opens.
4. Select the destination in the Restore Destination window.
5. Click **Restore**. The **Restore Status** window displays the restore processing status.

**Archiving and Retrieving Files**

This section contains procedures to help you perform a simple archive and retrieval of client files. For details and advanced procedures, see the *Backup-Archive Clients Installation and User’s Guide*.

**Note:** We recommend that you archive a small file or directory.

To archive files, select the files by name or description, or select them from a directory tree in the Tivoli Storage Manager main window.

**Note:** A user can assign an archive description for all archived files. The description can be up to 255 characters. If you do not enter a description, Tivoli Storage Manager assigns a default archive description. When you select the archive function from the backup-archive GUI, Tivoli Storage Manager displays a list of all previously used archive descriptions. You can use these displayed archive descriptions on future archives.

**To Archive Files by Name:**

**Note:** You can archive a file or a group of files with similar names. Specify the file name or path in the **Find Files** window. Assign a unique description for each archive package.

To archive a file:
1. Click the **Archive** button in the Tivoli Storage Manager main window. The **Archive by Tree** window opens.
2. Expand the directory tree.
3. Click the plus sign (+) next to a directory or drive.
4. Highlight the drive or directory that you want.
5. Click the **Find** button on the toolbar.
6. Enter the search criteria in the **Find Files** window.
7. Click **Search**. The **Matching Files** window opens.
8. Click the selection boxes next to the files you want to archive.
9. Click **Archive** to archive the files. The **Archive Status** window displays the status progress of the archive.
To Archive Files Using a Directory Tree:

Note: You can archive specific files or entire directories from a directory tree. You can also assign a unique archive description for each group of files you archive.

To archive your files:
1. Click the Archive button in the Tivoli Storage Manager main window. The Archive by Tree window opens.
2. Expand the directory tree.
3. Click the plus sign (+) next to a directory or drive.
4. Click the selection boxes next to the files or directories that you want to archive.
5. Click Archive. The Archive Status window opens. The Archive Status window displays the status progress of the archive.

Retrieving Archive Copies: You retrieve a file when you want to return an archive copy of a file or a directory from the Tivoli Storage Manager server to your workstation. To retrieve archive copies:
1. Click the Retrieve button on the Tivoli Storage Manager main window. The Retrieve by Tree window opens.
2. Expand the directory tree.
3. Click the plus (+) sign next to an object that you want to expand. The objects on the tree are grouped by archive package description.
4. Highlight the object in the tree that you want.
5. Click the Find button on the tool bar. The Find Files window opens.
6. Enter your search information in the Find Files window.
7. Click Search. The Matching Files window opens.
8. Click on the selection boxes next to the files you want to retrieve.
10. Enter the information in the Retrieve Destination window.
11. Click Retrieve. The Retrieve Status window displays the processing results.
Chapter 3. Server and Client Communications

IBM Tivoli Storage Manager supports a number of server/client communication methods. You must configure the server and each client workstation. This chapter describes how to configure MVS, IBM Tivoli Storage Manager, and the client workstation for each communication method. The chapter also includes a brief description of connection failures and a results file.

This chapter includes the following sections:

• **APPC**
  - “Configuring the Server for APPC (SNALU6.2)” on page 41
  - “Configuring the OS/2 Client for APPC (SNALU6.2)” on page 41
  - “Configuring the Novell Client for APPC (SNALU6.2)” on page 41
  - “Configuring the Server for APPC” on page 46
  - “Example of Configuring the MVS Server with APPC” on page 49
  - “Configuring the OS/2 Client for APPC Using Communication Manager/2” on page 53
  - “Configuring Novell NetWare Client for APPC Using NetWare Requester” on page 60

• **3270 Emulation**
  - “Configuring the Server for 3270 Emulation” on page 63

• **TCP/IP and HTTP**
  - “Configuring the Server for TCP/IP Using IBM TCP/IP” on page 64
  - “Configuring the Server for TCP/IP Using TCPaccess” on page 66
  - “Configuring the Server for Web Access with IBM TCP/IP” on page 67
  - “Configuring the Server for Web Access with TCPaccess” on page 67
  - “Connecting with IBM Tivoli Storage Manager across a Firewall” on page 67

• **IUCV**
  - “Configuring the Server for IUCV” on page 67

• “Diagnosing Initial Connection Failures” on page 81
• “Software Requirements” on page 86
• “Results Files” on page 87

### Configuring the Server for APPC (SNALU6.2)

Use Table 9 on page 40 to help you configure the server for the APPC (SNALU6.2) communication method to allow a Novell NetWare or OS/2® client to connect to the server. You should first review the installation procedures for the server and for the Novell NetWare and OS/2 clients. This section provides the information you will need for those procedures.

See the following documentation for the installation procedures:

• Chapter 2, “Setting Up IBM Tivoli Storage Manager”, on page 17
• Backup-Archive Clients Installation and User’s Guide
• “Configuring the OS/2 Client for APPC Using Communication Manager/2” on page 53
The following is an explanation of the items on the worksheet. You must have this information before you begin configuring the server for APPC (SNALU6.2):

**Partner Description**
The description this item is normally known by

**Mode Description**
The description of the Logon Mode Table and Logon Mode Table Entry

**Novell Local Description**
The description of the Novell logical unit (LU)

**OS/2 Local Description**
The description of the OS/2 LU

**Reference Parameter**
A reference that can be used to trace information to the partner node and back

**VTAM® Parameter**
The name the parameter is known by VTAM

**VTAM Example**
The example name as used in this book

**VTAM Statement**
The part of the VTAM statement where the partner is located

**Your Data**
The space to write in your data. This is your data which corresponds to the data shown in the examples in this book.

---

### Table 9. Worksheet for COMMMETHOD SNALU6.2(APPC) for MVS

<table>
<thead>
<tr>
<th>PARTNER Description</th>
<th>Reference Parameter</th>
<th>VTAM Parameter Name</th>
<th>Example</th>
<th>VTAM Statement</th>
<th>Your Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network ID</td>
<td>s_netid</td>
<td>Network name</td>
<td>DEIBMFD</td>
<td>VSUL</td>
<td></td>
</tr>
<tr>
<td>Partner LU name or ACB name</td>
<td>partner Lu</td>
<td>ACBNAME</td>
<td>DSMSERV1</td>
<td>VAPPL</td>
<td></td>
</tr>
<tr>
<td>Application ID</td>
<td>applid</td>
<td>Applid</td>
<td>DSMSERV1</td>
<td>VAPPL</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MODE Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Logon Mode Table name</td>
</tr>
<tr>
<td>Logon Mode Name</td>
</tr>
<tr>
<td>Logon Mode Name</td>
</tr>
</tbody>
</table>

---

“Configuring Novell NetWare Client for APPC Using NetWare Requester” on page 60
Table 9. Worksheet for COMMUNICATIONS SNALU6.2(APPC) for MVS (continued)

<table>
<thead>
<tr>
<th>Reference Parameter</th>
<th>VTAM Parameter Name</th>
<th>Example</th>
<th>VTAM Statement</th>
<th>Your Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDBLK</td>
<td>vtam_xid</td>
<td>IDBLK</td>
<td>05D</td>
<td>VBUILD</td>
</tr>
<tr>
<td>IDNUM</td>
<td>c_independentlu</td>
<td>LU</td>
<td>F13833C0</td>
<td>VBUILD</td>
</tr>
<tr>
<td>PU name</td>
<td>c_pu</td>
<td>PU</td>
<td>F13833C</td>
<td>VBUILD</td>
</tr>
</tbody>
</table>

Note: Enter your data in uppercase to ensure correct acceptance by MVS

Key VTAM Statement Column

Here are the full names of the abbreviations in the VTAM Statement column of the worksheet:

- VSUL VTAM Setup List
- VAPPL VTAM APPLID Statement
- VBUILD Switched Major Node Definition

Server Option

Include the following option in the server options file for APPC (SNALU6.2) communications. You can write value you want to use in the blank space:

`luname dsmserv1 ____________`

Configuring the OS/2 Client for APPC (SNALU6.2)

Use Table 10 on page 42 to help configure your OS/2 client for the APPC (SNALU6.2) communication method. You should first review the instructions for installing the server and the OS/2 client. Then use this section to find the information for your configuration. See the following documentation for the installation instructions:

- Chapter 2, “Setting Up IBM Tivoli Storage Manager”, on page 17
- Installing the Clients

The following is an explanation of the data items on the worksheet. You must have this information before you begin the installation:

Local Description

The description this data item is normally known by

Chapter 3. Server and Client Communications 41
**Partner Description**  
The description this data item is normally known by

**Reference Parameter**  
A reference that can be used to trace information to the partner node and back

**Client Workstation Parameter**  
The name of the fields used on the windows in Communications Manager/2 (CM/2)

**Client Installation Example**  
The name used in the examples

**Window Abbreviation**  
The abbreviations of the windows used in CM/2. A list of the abbreviations and their corresponding full names follow the worksheet.

**Your Data**  
The space to write in your data. This is your data which corresponds to the data shown in the examples in this book.

---

**Table 10. Worksheet for COMMMETHOD SNALU6.2(APPC) for OS/2**

<table>
<thead>
<tr>
<th>Reference Parameter</th>
<th>Client Workstation Parameter</th>
<th>Client Installation Example</th>
<th>Window Abbreviation</th>
<th>Your Data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LOCAL Description</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Configuration Name</td>
<td>Configuration</td>
<td>T(96,823),(112,834)MAPPEDC</td>
<td>OC</td>
<td></td>
</tr>
<tr>
<td>Network ID of Workstation</td>
<td>c_netid</td>
<td>C&amp;SM LAN ID / Network ID / Partner network ID</td>
<td>DEIBMFD</td>
<td>TRAP LNC CTAH</td>
</tr>
<tr>
<td>Independent LU</td>
<td>c_independentlu</td>
<td>Local Node Name / Local PU name</td>
<td>F1383B0</td>
<td>LNC CTAH</td>
</tr>
<tr>
<td>IDBLK &amp; IDNUM</td>
<td>vtam_xid</td>
<td>Local node ID / Node ID</td>
<td>05D F333B</td>
<td>LNC CTAH</td>
</tr>
<tr>
<td>Link name</td>
<td></td>
<td>Link Name to Host</td>
<td>HOST0001</td>
<td>CL CTAH</td>
</tr>
<tr>
<td>Token Ring Address</td>
<td>dest_addr</td>
<td>LAN destination address</td>
<td>40001000002</td>
<td>CTAH</td>
</tr>
<tr>
<td>Partner Node Name</td>
<td></td>
<td>Partner node name</td>
<td>OS2A</td>
<td>CTAH</td>
</tr>
<tr>
<td><strong>PARTNER Description</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network ID of Application</td>
<td>s_netid</td>
<td>Network ID</td>
<td>DEIBMFD</td>
<td>PL</td>
</tr>
<tr>
<td>Application ID &amp; Alias</td>
<td>partner_lu</td>
<td>LU Name &amp; Alias</td>
<td>DSMSERV1 OS2NODEA</td>
<td>PL</td>
</tr>
<tr>
<td>Fully qualified Partner LU - Network ID</td>
<td>s_netid.partner_lu</td>
<td>Partner LU - Fully qualified name</td>
<td>DEIBMFD. DSMSERV1</td>
<td>CCSI</td>
</tr>
<tr>
<td>Server Program Name</td>
<td>applid</td>
<td>Partner TP - TP Name</td>
<td>DSMSERV1</td>
<td>CCSI</td>
</tr>
<tr>
<td>Logon Mode name</td>
<td>logmode</td>
<td>Mode name</td>
<td>#BATCH</td>
<td>SFI CCSI</td>
</tr>
</tbody>
</table>
Table 10. Worksheet for COMMMETHOD SNALU6.2(APPC) for OS/2 (continued)

<table>
<thead>
<tr>
<th>Reference Parameter</th>
<th>Client Workstation Parameter Name</th>
<th>Client Installation Example</th>
<th>Window Abbreviation</th>
<th>Your Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>CPI Communications Side Information - Symbolic destination name</td>
<td>Symbolic destination name</td>
<td>MVSTIVSM</td>
<td>CCSI</td>
<td>++</td>
</tr>
</tbody>
</table>

**Note:** ++ case sensitive - enter as specified by administrator

**Key to the Window Abbreviation Column**
Here are the full names of the abbreviations in the **Window Abbreviation** column.
- OC - Open Configuration
- TRAP - Token Ring or Other LAN Types DLC Adapter Parameters
- LNC - Local Node Characteristics
- SFI - SNA Features List
- CCSI - CPI Communications Side Information
- CL - Connections List
- AL - Adapter List
- CTAH - Connection to a Host

**Client Options File**
The following are the communication options that you must enter in the client options file (dsm.opt). The COMMMETHOD option value for APPC must always be **SNALU6.2**. The values listed for the other options are the values used in the examples for configuring the OS/2 client as discussed in “Configuring the OS/2 Client for APPC Using Communication Manager/2” on page 53. Blank spaces are provided for you to write in the values you used when you configured your OS/2 client for communications. Enter these options in the client options file.

```
commmethod snalu6.2
symbolicdestination ________ (for example, MVSTIVSM from side information panel information)
-OR-
partnerluname _________ (for example, DEIBMFD.DSMSERV1)
tpname _________ (for example, DMSERVI)
cpicmodename _________ (for example, #BATCH)
```

**Configuring the Novell Client for APPC (SNALU6.2)**
Use [Table 11 on page 44](#) to help you in configuring your Novell NetWare client for the APPC (SNALU6.2) communication method in order to connect to the Tivoli Storage Manager server. Before starting your configuration, you should first review the instructions for installing the server and for installing the Novell NetWare client. Then, use the examples in these instructions as a reference to obtain the information needed for your configuration. See the following documentation for the installation instructions:
- [Chapter 2, “Setting Up IBM Tivoli Storage Manager”, on page 17](#)
- [Installing the Clients](#)

The following is an explanation of the data items on the worksheet. You must have the following information from the worksheet before you begin the configuration:
Local Description
The description this data item is normally known by

Partner Description
The description this data item is normally known by

Reference Parameter
A reference that can be used to trace information to the partner node and back

Client Workstation Parameter
The name of the fields used on the windows in CSCON/SIUTIL

Client Installation Example
The name used in the examples

Window Abbreviation
The abbreviations of the windows used in CSCON/SIUTIL. A list of the abbreviations and their corresponding full names follow the worksheet.

Your Data
The space to write in your data. This is your data which corresponds to the data shown in the examples in this book.

Table 11. WORKSHEET for COMMETHOD SNALU6.2(APPC) for Novell

<table>
<thead>
<tr>
<th>Reference Parameter</th>
<th>Client Workstation Parameter Name</th>
<th>Client Installation Example</th>
<th>Window Abbreviation</th>
<th>Your Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOCAL Description</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 Service Profile</td>
<td>New Profile Name</td>
<td>APPCPRO</td>
<td>SSP</td>
<td></td>
</tr>
<tr>
<td>Network ID where workstation resides</td>
<td>c_netid</td>
<td>SNA Network ID</td>
<td>DEIBMFD</td>
<td>HCC</td>
</tr>
<tr>
<td>Network ID where application resides</td>
<td>s_netid</td>
<td>Network Name</td>
<td>DEIBMFD</td>
<td>LLCD</td>
</tr>
<tr>
<td>Independent LU Name or Local LU Name</td>
<td>c_independentlu</td>
<td>Peripheral Node Control Point Name / LU name</td>
<td>F13833C0</td>
<td>HCC LLCD</td>
</tr>
<tr>
<td>IDBLK IDNUM or Vtam XID</td>
<td>vtam_xid</td>
<td>Block ID and PUID for Token Ring Connection</td>
<td>05D F333C</td>
<td>STRC</td>
</tr>
<tr>
<td>Logical Adapter Name</td>
<td>Logical Adapter Name</td>
<td>TOKENSAA</td>
<td>STRC</td>
<td></td>
</tr>
<tr>
<td>Local PU name</td>
<td>c_pu</td>
<td>PU name</td>
<td>F138833C</td>
<td>LLCD</td>
</tr>
<tr>
<td>Side Information - Symbolic destination name</td>
<td></td>
<td>Side Information Record Name</td>
<td>MVSTIVSM MVSTIVSM.CPI</td>
<td>LLCD ++</td>
</tr>
</tbody>
</table>

PARTNER Description

IBM Tivoli Storage Manager for OS/390 and z/OS: Quick Start
Table 11. WORKSHEET for COMMMETHOD SNALU6.2(APPC) for Novell (continued)

<table>
<thead>
<tr>
<th>Reference Parameter</th>
<th>Client Workstation Parameter Name</th>
<th>Client Installation Example</th>
<th>Window Abbreviation</th>
<th>Your Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application ID or Partner LU Name</td>
<td>partner_lu</td>
<td>LU Name</td>
<td>DSMSERV1</td>
<td>PLCD</td>
</tr>
<tr>
<td>Token Ring Adapter address of workstation</td>
<td>dest_addr</td>
<td>Network Adapter Address</td>
<td>400010000003</td>
<td>PLCD</td>
</tr>
<tr>
<td>Local Program Name</td>
<td></td>
<td>Local Program Name</td>
<td>DSMC</td>
<td>PLCD</td>
</tr>
<tr>
<td>Server Program Name</td>
<td>applid</td>
<td>Remote Program Name</td>
<td>DSMSERV1</td>
<td>PLCD</td>
</tr>
<tr>
<td>Logon Mode Name</td>
<td>logmode</td>
<td>Mode Name</td>
<td>#BATCH</td>
<td>MCD</td>
</tr>
<tr>
<td>Side Information - Symbolic destination name</td>
<td>Side Information Record Name</td>
<td>MVSTIVSM</td>
<td>PLCD MCD</td>
<td>++</td>
</tr>
<tr>
<td>CSCON profile name</td>
<td></td>
<td>SAA® Service Profile Name</td>
<td>APPCRO</td>
<td>MCD</td>
</tr>
</tbody>
</table>

**Note:** ++ case sensitive - enter as specified by administrator

**Key to Window Where Parameters Appear**

The following lists the full names of the abbreviations in the **Window Abbreviation** column of the above worksheet.
- **SSP** - Select Service Profile
- **HCC** - Host Connection Configuration
- **STRC** - SNA Token Ring Configuration
- **LLCD** - Local LU Configuration Data
- **PLCD** - Partner LU Configuration Data
- **MCD** - Mode Configuration Data

**Client Options File**

The following are the communication options that you must enter in the client options file (dsm.opt). The COMMMETHOD option value for APPC must always be **SNALU6.2**. The values listed for the other options are the values used in the examples for configuring the Novell NetWare client. Blank spaces are provided for you to write in the values you used when you configured your Novell NetWare client for communications. Enter these options in the client options file. Refer to **Installing the Clients**.

```
commmethod snalu6.2
symbolicdestination ____________ (for example, MVSTIVSM from side information panel information)
```
Configuring the Server for APPC

APPC lets two partner programs communicate through a defined protocol. The interface to the protocol mechanisms on each side is called a logical unit (LU). To allow program-to-program communication, these LUs must be of type 6.2 (LU6.2). APPC protocols are more complex to implement than other protocols. However, the APPC protocols provide better performance and reliability, and they should be considered as preferred protocol for use with Tivoli Storage Manager. This particularly applies when Tivoli Storage Manager supports LAN server clients such as OS/2 LAN servers or Novell NetWare servers.

Connectivity Support

Tivoli Storage Manager implements Independent LUs. SNA PU type 2.1 support is required in VTAM, the SNA gateway, and in IBM Tivoli Storage Manager client communications software. In an MVS environment, PU 2.1 support is provided as a combination of communications gateway software and VTAM levels.

For the supported communications gateways, the requirements are the following:

• 3745 Communications Controller
  PU 2.1 support requires the following software levels:
  – NCP Version 5 Release 2, or higher
  – VTAM Version 3 Release 2 (VTAM/XA; 5665-289), or higher
• 3172 Interconnect Controller
  PU 2.1 support requires the following software levels:
  – Interconnect Controller Program Version 2, or higher
  – VTAM Version 3 Release 4 (VTAM/ESA; 5685-085), or higher
• 3174 Workstation Controller
  PU 2.1 support requires the following software levels:
  – 3174 Licensed Internal Code, Configuration C Release 1, or higher
    OR
  – 3174 Licensed Internal Code, Configuration B with RPQ#8Q0800, Typw 2.1 Passthru Function
  – VTAM Version 3 Release 4 (VTAM/ESA; 5685-085), or higher

VTAM Setup

Your VTAM system administrator or systems programmer defines a new application to VTAM through the use of an access control block (ACB). An ACB defined for Tivoli Storage Manager, when added to the VTAM configuration, provides an application ID which the client references when it wants to connect to the Tivoli Storage Manager server. When the Tivoli Storage Manager application ID is referenced, a logon procedure is begun which ultimately tells the server where to look for the Tivoli Storage Manager client.

The VTAM APPL Statement

You define the ACB in the VTAM APPL statement. The following is an example of the APPL statement that the VTAM systems programmer should add to your VTAM configuration:

```
TIVSM  VBUILD TYPE=APPL
DMSERV1 APPL
    ACBNAME=DMSERV1,EAS=30,AUTH=(ACQ,PASS,VPACE), HAVAIL=YES,APPC=YES,PARSEC=YES,SONSCIP=YES,
    VPACING=5,MODETAB=ISTINCLM,DLOGMOD=#BATCH,
```
DSMSERV1 is the application ID (applid) that the Tivoli Storage Manager client references when it wants to connect to the server. The way in which the client references this name is discussed later in this installation guide where we cover client connectivity. If you are installing the OS/2 client and you prefer to review that section now, you can find it in “Configuring the OS/2 Client for APPC Using Communication Manager/2” on page 55. If you are installing the Novell NetWare client and you prefer to review that section now, you can find it in “Configuring Novell NetWare Client for APPC Using NetWare Requester” on page 60.

The Logon Mode Definition
When the client references the application ID for the Tivoli Storage Manager server (DSMSERV1), the MODETAB=ISTINCLM and DLOGMOD=#BATCH parameters reference a logon mode definition which establishes the connection and the characteristics of the session. These characteristics include the maximum number of sessions allowed, the maximum number of conversations allowed, and other control information. MODETAB references the table in which the logon mode definition entry is found. In this example, the table referenced is the IBM supplied VTAM default table (ISTINCLM). DLOGMOD references the table entry itself which is the logon mode definition #BATCH. We recommend that you use the #BATCH mode entry in the VTAM default logon mode table (ISTINCLM) initially to establish the APPC connection. Depending on your VTAM level, this mode might not be pre-defined in the default logon mode table. You should verify this with your VTAM system programmer. If this mode is needed, add it to the default logon mode table as shown below:

```
TITLE '#BATCH'
#BATCH MODEENT LOGMODE=#BATCH, X
   ENCR=B'0000',SSNDPAC=8, X
   SRCVPAC=8,PSNDPAC=8
```

After you have the APPC connection established and would like to create a new mode for performance tuning, you can create it in your current logon mode table, compile, and then link-edit the member into the VTAM library.

In VTAM, a response unit (RU) is a message unit that acknowledges a request. Since the RU size is negotiated between VTAM and the workstations, you do not have to specify a size in the #BATCH logon mode definition. However, if you specify a size, it should be at least 4K.

The Switched Major Node Definition
Each workstation connected to the network must be represented on the network as a physical unit (PU). A PU can have one or more logical units (LUs). However, only one LU on a PU can be an independent LU. An independent LU can activate a session directly with the server LU without asking for services from the VTAM system services control point (SSCP). A dependent LU, however, must request services from the SSCP in order to activate a session with server LU. The LU provides the end user application with the ability to access and communicate with the server.

The PUs and their associated LUs for the Tivoli Storage Manager clients are defined and linked together through a VTAM switched major node definition. A switched major node is the major building block of VTAM through which all the PUs and LUs for a given application such as Tivoli Storage Manager are linked together so that they can communicate with the server. The APPC connection for an Tivoli Storage Manager client must be made through an independent LU.
You define a switched major node through the VTAM build statement (VBUILD). The following VBUILD statement (Figure 10) defines the PUs and LUs for three workstations. F13833B0, F13833C0, F13833D0 are the independent LUs. Based on your Tivoli Storage Manager client configuration, you must define a similar VBUILD statement.

```
* SWITCHED MAJOR NODE *
* VBUILD TYPE=SWNET, MAXGRP=1, MAXNO=1 *

F13833B PU ADDR=C5, X
    IDBLK=05D, IDNUM=F333B, X
    ISTATUS=ACTIVE, X
    PUTYPE=2, MAXOUT=8, MAXDATA=4105, MAXPATH=1, X
    VPACING=8, PACING=8, DISCNT=NO, X
    USSTAB=USSSNAM, SSCPFM=USSSCS, X
    MODETAB=MTD1SERH, DLOGMOD=QUERY X

F13833B0 LU LOCADDR=0, MODETAB=ISTINCLM, DLOGMOD=#BATCH, X
    VPACING=8, PACING=8

F13833B1 LU LOCADDR=2
F13833B2 LU LOCADDR=3
F13833B3 LU LOCADDR=4
F13833B4 LU LOCADDR=5
F13833B5 LU LOCADDR=6, MODETAB=W13820, PACING=0, VPACING=0, X
    DLOGMOD=IBM3820T

F13833C PU ADDR=C5, X
    IDBLK=05D, IDNUM=F333C, X
    ISTATUS=ACTIVE, X
    PUTYPE=2, MAXOUT=8, MAXDATA=4105, MAXPATH=1, X
    VPACING=8, PACING=8, DISCNT=NO, X
    USSTAB=USSSNAM, SSCPFM=USSSCS, X
    MODETAB=MTD1SERH, DLOGMOD=QUERY X

F13833C0 LU LOCADDR=0, MODETAB=ISTINCLM, DLOGMOD=#BATCH, X
    VPACING=8, PACING=8

F13833D PU ADDR=C5, X
    IDBLK=05D, IDNUM=F333D, X
    ISTATUS=ACTIVE, X
    PUTYPE=2, MAXOUT=8, MAXDATA=4105, MAXPATH=1, X
    VPACING=8, PACING=8, DISCNT=NO, X
    USSTAB=USSSNAM, SSCPFM=USSSCS, X
    MODETAB=MTD1SERH, DLOGMOD=QUERY X

F13833D0 LU LOCADDR=0, MODETAB=ISTINCLM, DLOGMOD=#BATCH, X
    VPACING=8, PACING=8
```

**Figure 10. SWNET Major Node**

**Tivoli Storage Manager Server Setup**

Enter the ACBNAME (DSMSERV1) from VTAM APPL statement in the server options file's LUNAME option. Refer to “The VTAM APPL Statement” on page 46. The entry takes the following format:

```
!luname dmserv1
```

The ACBNAME identifies the Tivoli Storage Manager server to VTAM as the application to which the client can connect.
Example of Configuring the MVS Server with APPC

You can use this section as a reference when configuring MVS and the Tivoli Storage Manager server for APPC communications. It also provides scenarios for configuring the following clients for APPC communications:

- TSO administrative client
- OS/2 backup-archive and administrative clients
- Novell NetWare backup-archive client
- AIX® backup-archive and administrative clients

This section also provides help in diagnosing initial client/server connection failures.

Configuring an MVS Server in a Cross-Domain Network

The following configurations were done in a cross-domain environment. All the workstations are generated to the 3745 in the DEIBMFD network with the SSCPNAME as FDW. The 3745 is channel-attached to an MVS host machine in the DEIBMA4 network. This MVS machine is connected to another MVS host machine where the Tivoli Storage Manager server application, named A4V, is running.

Note: MVS/APPC must be started to run TSO administrative client. For other clients, the LU6.2 is sufficient.

VTAM/NCP Setup

The following VTAM definitions must be made on the adjacent SSCP. The MVS host machine is channel-attached to the 3745 in this environment.

1. We recommend that you use the #BATCH mode in the VTAM default logon mode table (ISTINCLM) initially to establish the APPC connection. See Figure 11. Depending on your VTAM level, this mode might not be pre-defined in the default logon mode table. You should verify this with your VTAM system programmer. If this mode is needed, add it to the logon mode table, compile, and then link-edit the member into a VTAM library.

   TITLE '#BATCH'
   #BATCH  MODEENT  LOGMODE=#BATCH,    X
           ENCR=B'0000',SSNDPAC=8,    X
           SRCVPAC=8,PSNDPAC=8,TYPE=0

   Figure 11. #BATCH mode entry

   If desired, you can create a new mode for performance tuning after the APPC connection is established. To do this, create it in your current logon mode table, compile it, and then link-edit the member into a VTAM library.

   Since the RU size is negotiated between VTAM and the workstations, we recommend that you define a dummy mode table entry (see below). However, if you are going to specify an RU size, you should use a block size of at least 4KB.

   TSMAPPC  MODEENT  LOGMODE=TSMAPPC

2. Define a physical unit (PU) and an independent logical unit (LU) in the SWNET Major Node. An independent LU is denoted by locaddr=0. In the following example, the PU is defined as F13833B and the independent LU is defined as F13833B0. See Figure 12 on page 50.
This makes it much easier to implement Advanced Peer-to-Peer Network (APPN®). The CPNAME has to be the same as the independent LU name. In the above example, use CPNAME=F13833B0 instead of IDBLK and IDNUM.

**MVS VTAM Setup**

The following steps must be completed on an MVS host machine where the server application is executed. In this environment, the MVS host machine name is A4V.

1. Define an APPL statement for the Tivoli Storage Manager MVS application in VTAM. See Figure 13.

   ```plaintext
   *------------*
   * SWITCHED MAJOR NODE *
   *------------*
   * VBUILD TYPE=SWNET, MAXGRP=1, MAXNO=1  
   *
   F13833B PU ADDR=C5, IDBLK=O5D, IDNUM=F333B, <==== see explanation below ISTATUS=ACTIVE, PUTF=2, MAXOUT=8, MAXDATA=4105, MAXPATH=1, VPACING=8, PACING=8, DISCNT=NO, USSTAB=USSSNAM, SSCP=USSSCS, MODETAB=MTD1SERH, DLOGMOD=QUERY  
   *
   F13833B0 LU LOCADDR=0, MODETAB=ISTINCLM, DLOGMOD=#BATCH, VPACING=8, PACING=8
   F13833B1 LU LOCADDR=2  
   F13833B2 LU LOCADDR=3  
   F13833B3 LU LOCADDR=4  
   F13833B4 LU LOCADDR=5  
   F13833B5 LU LOCADDR=6, MODETAB=W13820, PAGING=0, VPACING=0, DLOGMOD=IBM3820T
   *
   F13833C PU ADDR=C5, IDBLK=O5D, IDNUM=F333C, ISTATUS=ACTIVE, PUTF=2, MAXOUT=8, MAXDATA=4105, MAXPATH=1, VPACING=8, PACING=8, DISCNT=NO, USSTAB=USSSNAM, SSCP=USSSCS, MODETAB=MTD1SERH, DLOGMOD=QUERY  
   *
   F13833C0 LU LOCADDR=0, MODETAB=ISTINCLM, DLOGMOD=#BATCH, VPACING=8, PACING=8
   *
   F13833D PU ADDR=C5, IDBLK=O5D, IDNUM=F333D, ISTATUS=ACTIVE, PUTF=2, MAXOUT=8, MAXDATA=4105, MAXPATH=1, VPACING=8, PACING=8, DISCNT=NO, USSTAB=USSSNAM, SSCP=USSSCS, MODETAB=MTD1SERH, DLOGMOD=QUERY  
   *
   F13833D0 LU LOCADDR=0, MODETAB=ISTINCLM, DLOGMOD=#BATCH, VPACING=8, PACING=8

Figure 12. SWNET Major Node

This makes it much easier to implement Advanced Peer-to-Peer Network (APPN®). The CPNAME has to be the same as the independent LU name. In the above example, use CPNAME=F13833B0 instead of IDBLK and IDNUM.

**MVS VTAM Setup**

The following steps must be completed on an MVS host machine where the server application is executed. In this environment, the MVS host machine name is A4V.

1. Define an APPL statement for the Tivoli Storage Manager MVS application in VTAM. See Figure 13.

   ```plaintext
   A4VBTSM VBUILD TYPE=APPL  
   A4VTSM2 APPL ACBNAME=A4VTSM2, EAS=30, AUTH=(ACQ, PASS, VPACE), HAVAIL=YES, APC=YES, PARS=DEF=YES, DLOGMOD=#BATCH, VPACING=5, VLOGMOD=IBMTMST, SRES=DEF=YES, HAVAIL=YES, DLOGMOD=#BATCH, DSESLIM=4

Figure 13. Sample APPL Statement
In this example, the ACBNAME parameter, known as the LU name by the Tivoli Storage Manager server, is the partner LU that the clients see. MODETAB is the logon mode table entry name. DLOGMOD is the default logon mode entry name.

The DSESLIM parameter has been coded to handle two concurrent sessions from each LU; for example, when you run the administrative client and the backup client from the same workstation. You can increase this value if necessary.

**Note:** For more information about the APPL parameters, see the VTAM Resource Definition Reference.

2. In the server options file, use the name specified with the ACBNAME keyword of the VTAM APPL statement. For example:

   `luname A4VTSM2`

3. Ensure the VTAMLIB contains the load module for the mode entry table that has the log mode defined. This load module is also loaded in the 3745-NCP.

**Configuring an MVS Server in a Single-Domain Network**

The steps in “Configuring an MVS Server in a Cross-Domain Network” on page 49 can be applied to the single network environment. A single network ID is used throughout all of the clients’ configuration files.

Depending on where the control unit is attached, the setup for the server can be simplified. In the example environment, the control unit is not channel-attached to the same host machine where Tivoli Storage Manager is running. Therefore, you have two VTAMs to deal with. The log mode that you defined on the NCP must also exist on the second host machine where the application is running. However, define the independent LUs only on the host machine where the control unit is attached. The host machine is the owning SSCP.

In the case where the control unit is attached to the same application host machine, you only deal with one VTAM.

**Configuring the 3172 Communication Controller**

Configuration of the 3172 control unit environment is similar to the configuration of the 3745 control unit environment except for the single domain network. In most cases, the control unit is channel-attached to the same host machine that Tivoli Storage Manager is running on.

**Configuring the 3174 Communication Controller**

Figure 14 on page 52 contains sample 3174 PU and LU definitions for use with Tivoli Storage Manager.
The following is a list of recommendations and requirements from the 3174 support group:

- If you use the APPN Feature Code, which we recommend, you must implement APPN to support Tivoli Storage Manager. You should define the 3174 as an NN (network node). We also recommend that the workstations using Tivoli Storage Manager be configured as EN (end nodes).

- The APPN Feature requires 4MB of RAM on the 3174. For performance enhancement, we recommend that the 3174 have 6MB of RAM.

For more information on configuring the 3174 for APPN connectivity see manuals: 3174 APPN Implementation Guide (GG24-3702) and IBM 3174 Establishment Controller Installation Guide (GG24-3061).

- Code DYNAMLU=YES on the 3174 PU macro to utilize VTAM cross-domain resources. This eliminates the need for coding the independent LU LOCADDR=0.

- The mode used for Tivoli Storage Manager communication must be specified in the 3174 MODE/COS Correlation panel during the APPN feature customization.

Note: See the software requirements for the 3174 in “Software Requirements” on page 86.

Figure 14. VTAM Definition for 3174 Token Ring LAN Gateway

The following is a list of recommendations and requirements from the 3174 support group:

- If you use the APPN Feature Code, which we recommend, you must implement APPN to support Tivoli Storage Manager. You should define the 3174 as an NN (network node). We also recommend that the workstations using Tivoli Storage Manager be configured as EN (end nodes).

- The APPN Feature requires 4MB of RAM on the 3174. For performance enhancement, we recommend that the 3174 have 6MB of RAM.

For more information on configuring the 3174 for APPN connectivity see manuals: 3174 APPN Implementation Guide (GG24-3702) and IBM 3174 Establishment Controller Installation Guide (GG24-3061).

- Code DYNAMLU=YES on the 3174 PU macro to utilize VTAM cross-domain resources. This eliminates the need for coding the independent LU LOCADDR=0.

- The mode used for Tivoli Storage Manager communication must be specified in the 3174 MODE/COS Correlation panel during the APPN feature customization.

Note: See the software requirements for the 3174 in “Software Requirements” on page 86.

Configuring IBM Tivoli Storage Manager Clients to the MVS Server

Note: See the worksheets “Configuring the Server for APPC (SNALU6.2)” on page 39, “Configuring the OS/2 Client for APPC (SNALU6.2)” on page 41, and “Configuring the Novell Client for APPC (SNALU6.2)” on page 43 and Installing the Clients for additional information.

Before configuring the clients, obtain the following information from the VTAM administrator and the MVS system administrator:

**CLIENT REQUIREMENTS**

- c_netid
  Network ID of the network where the client workstation’s PU and LU are defined. In this network topology, it is the 3745.

- c_independentlu
  Independent LU name defined in the 3745 VTAMLST where locaddr=0.
c_pu  PU name defined in the 3745 VTAMLST. This parameter is required for the NetWare client, but is not required for the other clients.

vtam_xid  IDBLK and IDNUM defined in the 3745 VTAMLST for the PU. This is required for the host link definition.

logmode  LOGMODE name defined in the mode table entry in the 3745 VTAMLST.

SERVER REQUIREMENTS

s_netid  Network ID of the network where the server application resides.

dest_addr  Token ring adapter address of the adjacent SSCP. In this network topology, it is the locally administered address to the 3745.

partner_lu  Server’s LU to be used as client’s Partner LU. This is the ACBNAME in the APPL statement.

Configuring the OS/2 Client for APPC Using Communication Manager/2

The example configuration that follows uses Communication Manager/2 (CM/2) level 1.0. To begin the configuration process for CM/2, follow these steps:

1. From the OS/2 Desktop, double click on the Communication Manager/2 icon.
2. Double click on the Communication Manager Setup icon. The Communication Manager Setup window appears.
3. Press the Setup button. The Open Configuration window appears. See Figure 15 on page 54.
4. Enter a new name in the **Configuration** field. If you want a description, enter it in the **Description** field.

5. Press the **OK** button. Answer **Yes** to any messages that appear.

6. On the **Communications Manager Configuration Definition - APPC** window, select **Token-ring or other LAN types** for the **Workstation Connection Type**.

7. Select **CPI Communications** for the **Feature or Application**.

8. Press the **Configure...** button.

After you have followed the previous steps, the **Communication Manager Profile List Sheet** window is displayed. All of the profiles listed need to be configured. The profiles are:
- DLC - Token-ring or other LAN types
- SNA local node characteristics
- SNA connections
- SNA features

The following sections show you the CM/2 windows and the information that you need to fill in.

**Note:** See "CM/2 .ndf File for 3172 or 3745 Gateways" on page 90 for the sample .ndf file that would be created by completing the following procedure.

In the **Communications Manager Profile List Sheet** window, double click on DLC - Token-ring or other LAN types. The **Token Ring or Other LAN Types DLC Adapter Parameters** window appears. See Figure 16 on page 55.
1. Enter the c_netid in the C&SM LAN ID field.
2. Press the OK button.

In the Communications Manager Profile List Sheet window, double click on SNA local node characteristics. The Local Node Characteristics window appears. See Figure 17.

1. Enter the c_netid in the Network ID field.
2. Enter the c_independentlu in the Local node name field.
3. Select End node - no network node server for the Node type. You need to select End node to network node server if you are connecting to an APPN network node server.
4. Enter the vtam_xid in the Local node ID fields. These values can be left with zeros if CPNAME is used in the VTAMLST.
5. Press the OK button to return to the Communications Manager Profile List Sheet window.
In the Communications Manager Profile List Sheet window, double click on SNA connections. The Connections List window appears. See Figure 18.

1. Select To host in the Partner type group box.
2. Press the Create... button.

When you press the Create... button in the Connections List window, the Adapter List window appears. See Figure 19.

1. Select Token-ring or other LAN types if you are using token ring.
2. Press the Continue... button.

Figure 18. Connections List Window

Figure 19. Adapter List Window
When you press the Continue... button in the Adapter List window, the Create a Connection to a Host window appears. See Figure 20.

### Create a Connection to a Host

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Link name</td>
<td>HOST0002</td>
</tr>
<tr>
<td>LAN destination address (hex)</td>
<td>4000100000002</td>
</tr>
<tr>
<td>Partner network ID</td>
<td>DEIBMF0D</td>
</tr>
<tr>
<td>Partner node name</td>
<td>BCTSO</td>
</tr>
<tr>
<td>Local PU name</td>
<td>F13B3B0</td>
</tr>
<tr>
<td>Node ID (hex)</td>
<td>05D F333B</td>
</tr>
</tbody>
</table>

- Use this host connection as your focal point support
- APPN support
- Optional comment

#### Figure 20. Create a Connection to a Host

1. Enter the dest_addr in the LAN destination address field.
2. Enter the c_netid in the Partner network ID field. This is the network identification number of the adjacent CP (3745-NCP) that the client workstation is generated to. In this example, it is the client’s network ID.
3. Enter a value in the Partner node name field. This is the SSCPNAME in VTAMLST. For the OS/2 client, this can be any value you want. BCTSO is used in this example.
4. Enter the vtam_xid in the Node ID fields. These values are required for the host link connection definition. It could be zeros if CPNAME is used in the VTAMLST.
5. Press the Define Partner LUs... button.

When you press the Define Partner LUs... button in the Create a Connection to a Host window, the Create Partner LUs window appears. See Figure 21 on page 58. Defining Partner LUs generates the DEFINE_PARTNER_LU_LOCATION statement. This ensures that the FQ_OWNING_CP_NAME parameter is in the .ndf file.
1. Enter the `partner_lu` in the LU Name field.
2. Enter a value in the Alias field. The Partner LU alias can be any value you want.
3. Press the Add button to add the Partner LU to the list.
4. Press the OK button to return to the Connections List window.
5. Press the Close button to return to the Communications Manager Profile List Sheet window.

In the Communications Manager Profile List Sheet window, double click on SNA features. The SNA Features List window appears.

1. Select Partner LUs in the Features list.
2. Select the Partner LU you previously defined in the far right list. In this example, the Partner LU name is `A4VTSM2`.
3. Press the Change... button.

When you press the Change... button in the SNA Features List window, the Change a Partner LU window appears.

1. Update the Partner LU network ID if it is different from the client’s network ID (`s_netid`).

   **Note:** This updates the FQ_PARTNER_LU_NAME parameter in the DEFINE_PARTNER_LU statement. This is important if the client and server are on different networks.

2. Press the OK button to return to the SNA Features List window.

If you decide to create a new mode instead of using the predefined one (#BATCH), you need to complete the following steps:

1. In the SNA Features List window, select Modes from the Features list.
2. Press the **Create...** button to create a new mode. The **Create a Mode Definition** window appears.

3. Enter *logmode* in the **Mode Name** field.

   **Note:** The mode name must match the VTAM’s log mode defined in the mode table entry.

4. Press the **OK** button to return to the **SNA Features List** window.

   **Note:** You should use the **#BATCH** mode for Tivoli Storage Manager.

1. In the **SNA Features List** window, select **CPI Communications side information** from the **Features** list.

2. Press the **Create...** button. The **Create CPI Communications Side Information** window appears. See **Figure 22**. Use this window to create a symbolic destination name if you want to use one in the options file (dsm.opt).

<table>
<thead>
<tr>
<th>Create CPI Communications Side Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symbolic destination name</td>
</tr>
<tr>
<td>Partner LU</td>
</tr>
<tr>
<td>Fully qualified name</td>
</tr>
<tr>
<td>Alias</td>
</tr>
<tr>
<td>Partner TP</td>
</tr>
<tr>
<td>Service TP</td>
</tr>
<tr>
<td>TP name</td>
</tr>
<tr>
<td>Security type</td>
</tr>
<tr>
<td>Same</td>
</tr>
<tr>
<td>None</td>
</tr>
<tr>
<td>Program</td>
</tr>
<tr>
<td>Mode name</td>
</tr>
</tbody>
</table>

**Figure 22. Create CPI Communications Side Information Window**

3. Enter a value in the **Symbolic destination name** field. You can enter anything. The value that you enter here should also be the symbolic destination name in the client’s dsm.opt file.

4. Enter the **Fully qualified name** (*s_netid* and *partner_lu*) of the partner LU, or use the **Alias**.

5. Enter the server program name in the **TP name** field. This can be any value you want.

6. Select **Same** or **None** for the **Security type**.

7. Select the mode you just created from the **Mode name** field. Select **#BATCH** if you did not define one.

8. Press the **OK** button.

**Notes:**

1. If the same OS/2 client wants to have access to another host server, such as a VM or MVS server, via the same gateway, you need to define another partner
LU, a CPIC side information record, and a new mode if it is using a different mode name. You can quickly add the following statements to the .ndf file for the new server:

```
DEFINE_PARTNER_LU
DEFINE_PARTNER_LU_LOCATION
DEFINE_PARTNER_MODE
DEFINE_CPIC_SIDE_INFO
```

2. The VTAM SWNET Major Node defined the independent LU with MODETAB and DLOGMODE for the first server. This should not have any effect if the second server is using a different MODETAB and DLOGMODE. When the client establishes a connection to the server, the mode that is defined on the client overrides the mode defined in the VTAM SWNET Major Node definition.

### Starting the IBM Tivoli Storage Manager Client

1. Edit the dsm.opt file, giving the symbolic destination a value of MVSTIVSM. For example:

   ```
   commethod snalu6.2
   symbolicdestination mvstivsm
   ```

2. Ensure that CM/2 is started.
3. Start the Tivoli Storage Manager program

### Considerations for Using OS/2 Clients

Tivoli Storage Manager does not allow the user to choose the local LU for the client program. If CM/2 supports other applications that use independent LUs, you need to specify a default LU for Tivoli Storage Manager by adding the following statement to your .ndf file:

```
DEFINE_DEFAULTS DEFAULT_LOCAL_LU_ALIAS (<local LU alias>)
```

After adding this statement you need to run CMVERIFY /E to verify your changes and dynamically update the SNA information in CM/2.

**Note:** You must manually add this statement to the .ndf file. The Communication Manager Setup program provides no means for doing so.

### Configuring Novell NetWare Client for APPC Using NetWare Requester

In the NetWare configuration that follows, the SNA profile is created using DOS requestor.

#### Creating the CSCON Configuration Profile

1. Go to the SYSTEM/CSCON directory and invoke CSCON service.
2. Select Configure Communication Services.
3. Select NetWare for SAA.
4. Create a 2.1 type service profile called appcpro (Tivoli Storage Manager requires a type 2.1 service profile).
5. Select the newly created profile to create a host connection.

#### Creating a Host Connection
When you select **Configure Host Connection** from the **Configure SAA Service Profile** window, the **Host Connection Configuration** window appears.

1. Enter `c_netid` for the SNA network ID.
2. Enter `c_independentlu` for the Control Point Name.
3. Enter the number of licenses you have for NetWare SAA for the **Number Independent Sessions Supported**.
4. Place the cursor in the Host Attachment field and press the Insert key. Then select the type of LAN to be configured. We’re selecting **Token Ring** in this example.

**Configuring the SNA Token-Ring**

After you select **SNA Token Ring**, the **SNA Token Ring Configuration** window appears.

1. Enter `04` for **Token Ring Source Service Access Point**.
2. Enter `Primary` for **Token Ring Adapter Type**.
3. Enter `vtam_xid` for the **Block ID** and **PUID for Token Ring Connection** fields. If `CPNAME` is used in the VTAMLST, leave the default values for these two fields.
4. Enter the logical adapter name from the IPX bind statement in the autoexec.ncf file. For example, in `bind ipx to TOKENSAA net=ABCD`, TOKENSAA is the logical adapter name.
5. Exit CCON.

**Creating a Side Information File**

1. Go to the SYSTEM\NWSAA\CPIC directory and invoke the SIUTIL service.

   **Note:** The SIUTIL help facility clearly explains all of the fields.

2. Select **Create New Side Information File**.
3. Call the file `MVSTIVSM.CPI`.
4. Select **Add A Side Information Record**.
5. Call the record `MVSTIVSM`. This is the name to be used as symbolic destination in the client’s dsm.opt file. Beware of case sensitive fields because certain levels of SIUTIL do not automatically change entries to uppercase letters, but Tivoli Storage Manager changes the symbolic destination to uppercase letters.

**Defining Local LU Configuration**

When you select **Add a Side Information Record** from the **Side Information Records Command Menu** window, the **Local LU Configuration Data** window appears.

1. Enter the following:
   a. LU name: `c_independentlu`
   b. PU name: `c_pu`
   c. Detach PU Type: 1
   d. Security Type: 0
   e. LU Local Address: 0
   f. LU Session Limit: 8
   g. Network Name: `c_netid`
2. Press Ctrl PgDn to go to the PLU Record.
Defining Partner LU Configuration

When you press Ctrl PgDn from the Local LU Configuration Data window, the Partner LU Configuration Data window appears.

1. Enter the following:
   a. LU name: *partner.lu* (This is the Partner LU)
   b. Data Link Control Name: *ITRN*
   c. Network Adapter Number: 0
   d. Network Adapter Address: *dest_addr*
   e. LU Session Limit: 8
   f. Max Logical Record Size: 0
   g. Character Set: 0
   h. Local Program name: *DSMC*
   i. Remote Program Name: *DSMSERV*

2. Press Ctrl PgDn to go to the Mode Record.

Defining the Mode Configuration Data

When you press Ctrl PgDn from the Partner LU Configuration Data window, the Mode Configuration Data window appears.

1. Enter the following:
   a. Mode name: *logmode*
   b. Max Negotiable Session Limit: 8
   c. Automatic Activate Session Limit: 8
   d. Min Contention Winners Source: 0
   e. Min Contention Winners Target: 0
   f. Pacing size: 8
   g. Max RU size: 2048
   h. Min RU size: 256
   i. CNOS Flags: 6
   j. CNOS Termination Set: 4
   k. SAA Service Profile Name: *appcpro* (CSCON profile name)

2. Press Enter to save your changes.

3. Exit SITUIL.

Starting the IBM Tivoli Storage Manager Client

1. Edit the dsm.opt file, giving the symbolic destination a value of MVSTIVSM. For example:

```
commmethod snalu6.2
symbolicdestination mvstivsm
```

2. At the NetWare server console prompt, enter the following commands:

```
LOAD COMMMEXEC
CSLOAD APPCPRO
LOAD CPIC_SAA SYS:\SYSTEM\NWSAA\CPIC\MVSTIVSM.CPI
LOAD SYS:\TIVSM\DSMC
```

Note: Use CSUNLOAD APPCPRO to unload the appcpro profile.
Considerations for Using NetWare for SAA Clients

You can support two different service profiles on the NetWare for SAA client. For example, you could have a type 2.0 service profile for 3270 emulation and a type 2.1 service profile for Tivoli Storage Manager. There are two ways to accomplish this:

1. Use two separate, physical LAN boards on the NetWare server.
   The advantage of using a separate board for the LU6.2 traffic is performance.

2. Using the same physical board.
   NetWare for SAA can service a type 2.0 service profile and a type 2.1 service profile using the same physical board. For this to work, the SOURCE SAP (Service Access Point) for the 2.0 service profile should be changed to '08' and the 2.1 service profile should use a SOURCE SAP of '04'.

   Note: Using the same physical board does not work using SOURCE SAP '04' for the 2.0 service profile and SOURCE SAP '08' for the 2.1 service profile. The SOURCE SAP for the SNA connections are configured using CCON.

Configuring the Server for 3270 Emulation

Many large enterprises using MVS hosts already make wide use of 3270 emulation. An Tivoli Storage Manager client simply generates a sequence of keystrokes that results in a connection being established with the server.

OS/2, DOS, or Windows Tivoli Storage Manager clients can connect to an MVS server using 3270 emulation.

Connectivity Support

The IBM VTAM product is required to run the 3270 communication method on the Tivoli Storage Manager server.

VTAM Setup

Your VTAM system administrator or systems programmer defines a new application to VTAM through the use of an access control block (ACB). An ACB defined for Tivoli Storage Manager, when added to the VTAM configuration, provides an application ID that the Tivoli Storage Manager client references when it wants to connect to the server. When the Tivoli Storage Manager application ID is referenced, a logon procedure is begun which ultimately tells the Tivoli Storage Manager server where to look for the client.

The VTAM APPL Statement

You define the ACB in the VTAM APPL statement. The following is an example of the APPL statement that the VTAM systems programmer should add to your VTAM configuration:

```
TIVSM VBUILD TYPE=APPL
DSMAPPL APPL ACBNAME=DSMLU,
   MODETAB=ISTINCLM,DLOGMOD=#BATCH
```

DSMLU is the application ID that the client references when it wants to connect to the server. The way in which the client references this name is discussed later in this installation guide where we cover client connectivity.
The Logon Mode Definition

When the client references the application ID for the server (DSMLU), the MODETAB=ISTINCLM and DLOGMOD=#BATCH parameters reference a logon mode definition which establishes the connection and the characteristics of the session. These characteristics include the maximum number of sessions allowed, the maximum number of conversations allowed, and other control information. MODETAB references the table in which the logon mode definition entry is found. In this example, the table referenced is the IBM supplied VTAM default table (ISTINCLM), DLOGMOD references the table entry itself which is the default logon mode definition #BATCH.

We recommend that you use the #BATCH mode entry in the VTAM default logon mode table (ISTINCLM) initially to establish the 3279 emulation connection. Depending on your VTAM level, this mode might not be pre-defined in the default logon mode table. You should verify this with your VTAM system programmer. If this mode is needed, add it to the default logon mode table as shown below:

```
    TITLE 'BATCH'
    BATCH  MODEENT LOGMODE=#BATCH, X
          ENCR=B'0000', SSNDPAC=8, X
          SRCVPAC=8, PSNDPAC=8
```

After you have the 3270 emulation connection established and would like to create a new mode for performance tuning, you can create it in your current logon mode table, compile, and then link-edit the member into the VTAM library.

IBM Tivoli Storage Manager Server Setup

Enter the ACBNAME (DSMLU) from the above VTAM definition example in the LUNAME parameter of the server options file. The entry takes the following format:

```
luname dsmlu
```

The ACBNAME identifies the IBM Tivoli Storage Manager server to VTAM as the application to which the client can connect.

Configuring the Server for TCP/IP Using IBM TCP/IP

TCP/IP provides a reliable protocol and can be easily configured for the Tivoli Storage Manager server.

Connectivity Support

TCP/IP Communications Server (CS) is required to run the TCP/IP communication method on the Tivoli Storage Manager server.

In addition, TCP/IP communications requires a suitable communications gateway such as the following:

- 3745 Communications Controller
- 3172 Interconnect Controller
- Channel attached RISC System/6000

TCP/IP Communications Setup

Before starting the IBM Tivoli Storage Manager server, make sure that the following TCP/IP job, which includes the TCP/IP address space, has been started: TCPIP
The following TCP/IP jobs must be started if IUCV is available on your system and the IUCV communication method will be used:

- VMCF
- TNF

These are the names of the jobs as distributed with the TCP/IP product. If the names were changed during installation, you must determine the new names and make sure the jobs have been started.

The IBM Tivoli Storage Manager will use UNIX System Services (USS) sockets API when OS/390® is Release 5 or higher. This may require a change to the BPXPRMxx PARMLIB member for your installation (xx is a unique set of characters set by your systems programmer). In the BPXPRMxx member you will find statements similar to the following:

```
FILESYSTYPE TYPE(INET) ENTRYPONT(EZBPFINI)
NETWORK DOMAINNAME(AF_INET)
   DOMAINNUMBER(2)
   MAXSOCKETS(200)
   TYPE(INET)
```

or the following:

```
FILESYSTYPE TYPE(CINET) ENTRYPONT(BPXTCINT)
NETWORK DOMAINNAME(AF_INET)
   DOMAINNUMBER(2)
   MAXSOCKETS(200)
   TYPE (CINET)
```

The value specified with the MAXSOCKETS keyword must be greater than the value specified with the IBM Tivoli Storage Manager server option MAXSESSIONS.

**IBM Tivoli Storage Manager Server Setup**

Enter the following in the server options file:

- The name of the TCP/IP address space in the TCPNAME option
- The TCP/IP port address in the TCPPORT option
- Optional: The TCP/IP port for administrative sessions in the TCPADMINPORT option

You can find the name of the TCP/IP address space in the TCPIPTCPIP.DATA data set. TCP/IP uses this data set to specify configuration information required by TCP/IP client programs. The following example displays the first part of the TCPIPTCPIP.DATA set which identifies TCPIP as the name of the TCPIP address space.

```
*TCPIPJOBNAME specified the name of the started procedure which was
*used to start the TCPIP address space.  TCPIP is the default.
* TCPIPJOBNAME TCPIP
TCPIPUSERID TCPIP
```

You can obtain your TCP/IP port address from your network administrator. TCP/IP, when installed, comes with a number of predefined ports. Your network administrator can tell you which one has been assigned to the Tivoli Storage Manager server. The number of the port is associated with the job name or the started task name for the server.
For example, if **TCPIP** is the name of your TCP/IP address space and TCP/IP port **1500** has been assigned to the job name of the server, make the following entries in the server options file.

```
tcpname tcpip
tcpport 1500
```

---

**Configuring the Server for TCP/IP Using TCPaccess**

Sterling software offers TCPaccess for implementing TCP/IP on MVS. IBM Tivoli Storage Manager supports TCPaccess protocols.

**Connectivity Support**

TCPaccess V4.1 or later is required to run the TCPaccess protocol on the server.

Consult TCPaccess documentation for specifics on TCPaccess communication hardware requirements.

**TCPaccess Communications Setup**

Before starting the Tivoli Storage Manager server, make sure that TCPaccess is started. If TCPaccess is not started, the server attempts to establish contact with TCPaccess every minute. As a result, you do not have to stop and restart the server to establish contact but only start TCPaccess.

The server displays the ANR5092E message after each of the first seven unsuccessful attempts to contact TCPaccess, advising you that contact has not been made. After the seventh attempt, the message is suppressed.

**IBM Tivoli Storage Manager Server Setup**

Enter the following in the server options file:

- The TCPaccess subsystem name in the ICSSNAME option
- The TCP/IP port address in the ICSPORT option
- Optional: The TCP/IP port for administrative sessions in the ICSADMINPORT option.

You can find the TCPaccess subsystem name specified in the SSN parameter in the TCPaccess startup JCL. The default subsystem name is ACSS. You can find the TCPaccess startup JCL in SYS1.PROLIB. The TCPaccess subsystem name can be no longer than four characters.

You can obtain your TCP/IP port address from your network administrator. TCPaccess, when installed, comes with a number of predefined ports. Your network administrator can tell you which one has been assigned to the Tivoli Storage Manager server.

For example, if **ACSS** is the TCPaccess subsystem name and TCP/IP port **1500** has been assigned to the Tivoli Storage Manager server, make the following entries in the server options file.

```
icssname acss
icsport 1500
```
Configuring the Server for IUCV

Tivoli Storage Manager can use Inter-User Communication Vehicle (IUCV) to communicate with the TSO administrative client. However, it is recommended that either TCP/IP or APPC be used for TSO administrative client communications.

Connectivity Support

Ensure that IUCV is available on your system before trying to use it as a communication method for the TSO administrative client.

IBM Tivoli Storage Manager Server Setup

Enter the following in the server options file:

```
iucv start
```

Configuring the Server for Web Access with IBM TCP/IP

TCP/IP must be active before you can use the administrative web interface. Ensure that the ANRIDL job was run on the Tivoli Storage Manager server. See Figure 3 on page 20.

Enter a port number in the server options file:

```
httptcpport 1580
```

The default is 1580.

Configuring the Server for Web Access with TCPaccess

TCPaccess communications must be active before you can use the administrative web interface. Also, ensure that the ANRIDL job was run on the Tivoli Storage Manager server (see Figure 3 on page 20).

Enter a port number in the server options file:

```
httpicsport 1580
```

The default is 1580.

Connecting with IBM Tivoli Storage Manager across a Firewall

The IBM Tivoli Storage Manager server and clients can work across a firewall, or the server can securely manage client backup and restore operations and administrative functions across a firewall. To enable clients to work across a firewall, configure the firewall to open the ports that the server and clients need. Ports need to be opened only if functions beyond those of server-prompted scheduling are required. Server-prompted scheduling can be handled with the SESSIONINIT=SERVERONLY and HLA and LLA options of the REGISTER NODE or UPDATE NODE commands. Because firewalls differ in the manner in which ports open, follow the instructions that accompanied the firewall software or hardware that you are using. If you need help configuring the firewall, contact the supplier of your firewall.
The following operations require that you open ports on the firewall:

- To enable clients to communicate with a server across a firewall, open the TCP/IP port for the server on the TCPPORT option in the dsmserv.opt file. The default TCP/IP port is 1500. When authentication is turned on, the information that is sent over the wire is encrypted.

  **Note:** If the TCPADMINPORT option is specified, sessions from clients without administration authority can be started on the TCPPORT port only.

- To use the administrative Web interface for a server across a firewall, open the HTTP port for the server on the HTTPPORT option in the dsmserv.opt file. The default HTTP port is 1580.

  The information that is transmitted is not encrypted. To encrypt information between the server and the web browser, use the Tivoli Storage Manager Secure Web Administrator Proxy for the Web and administration of the IBM Tivoli Storage Manager server. 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. After you set up the proxy, use it to administer any Tivoli Storage Manager server at Version 3.7 or higher. For more information about installing and using the proxy, see Appendix B, “Setting Up the Secure Web Administrator Proxy”, on page 115.

- To use the Web backup-archive client to connect to a client across a firewall, use the client at Version 4.1.2 or later. Open these ports on the firewall:
  - The HTTP port for the client on the HTTPPORT option in the client dsm.opt file. The default client HTTP port is 1581.
  - The two ports that are specified on the WEBPORTS option in the dsm.opt file. By default, Web ports are assigned randomly which do not work across a firewall. Specify this option with non-zero values for both ports; then, open these ports on the firewall. Information is encrypted over the wire when authentication is turned on.

  You can specify a separate port on which the server TCP/IP communication driver waits for requests for sessions other than client sessions. This includes administrative sessions, server-to-server sessions, storage agent sessions, SNMP subagent sessions, managed server sessions, and event server sessions. Use the TCPADMINPORT option in the dsmserv.opt file to specify the port number. The default port is 1500. Using different port numbers for the options TCPPORT and TCPADMINPORT enable you to create one set of firewall rules for client sessions and another set for the other session types.

  **Note:** If TCPADMINPORT and TCPPORT differ, separate processes are used to service administrative sessions and client sessions.

  If TCPPORT and TCPADMINPORT specify different ports, any client sessions attempting to use the port that is specified on the TCPADMINPORT option will end. Administrative sessions are permitted on either port but, by default, will use the port that is specified on the TCPADMINPORT option.

  If you use the SessionInitiation parameter of the REGISTER NODE or UPDATE NODE commands, you can close the port at the firewall that is specified on the TCPPORT option and specify nodes whose scheduled sessions are started from the server. If you need an ad hoc session or a restore session, you must open the port.

  By default, clients contact the server. To permit the start of scheduled backup-archive client sessions to the server only, change the SessionInitiation
parameter to ServerOnly either on the REGISTER NODE command, or on the UPDATE NODE command and specify the HLA and LLA options. These options must match what the client is using, otherwise the server will not know how to contact the client. By doing so, you specify that the server will not accept client requests for sessions. All sessions must be started by server-prompted scheduling on the port that was defined for the client with the REGISTER NODE or the UPDATE NODE commands. If you select the CLIENTORSERVER option, the client might start sessions with the server by communicating on the TCP/IP port that was defined with the TCPPORT server option. Server-prompted scheduling also can be used to prompt the client to connect to the server.

Note: This function is for server-prompted scheduling only.

Scheduled backup-archive client sessions are started by the server. You can permit individual clients to start sessions with a server on a node-by-node basis. Scheduling always uses the high-level address and the low-level address that you set on the REGISTER NODE or UPDATE NODE commands.

To start a session outside a firewall, specify a port on which the server listens for client session requests on the port that the client defined. Use the TCPPORT option in the dsmserv.opt file to specify the port number. The default TCP/IP port is 1500.

---

**Configuring a DOS Client for 3270 Emulation**

The following communications software is required in order to run the DOS Tivoli Storage Manager client using 3270 emulation:

- IBM Personal Communications/3270 3.0 (42G0452) or later
- Attachmate EXTRA! emulation product

To configure the DOS client for communications, you must first create the client options file (dsm.opt) and then, modify it with the minimum required settings.

1. To create the client options file, type the following at the command prompt and press Enter:
   ```
   copy dsm.smp dsm.opt
   ```

2. Modify the NODENAME option so that it corresponds with the name assigned to the client node when it was registered through the administrator command interface. See "Registering Backup-Archive Client Nodes" on page 34
   For example, if the node name assigned during registration was client1, make the entry as follows:
   ```
   nodename client1
   ```

3. Modify the 3270HOSTCOMMAND option with a command string that includes a logon command that will connect the 3270 terminal to the IBM Tivoli Storage Manager server. The logon command takes the form LOGON APPLID(), where the application id specified within the parenthesis is the name defined for the Tivoli Storage Manager server during VTAM setup. For example, in "The VTAM APPL Statement" on page 63 the name defined for the server is DSMLU.
   The command string can also contain any sequence of keystrokes such as clearing a logo and perhaps switching to a particular VTAM panel. For
example, the following string clears the screen, gets the VTAM applications panel up, and logs on to the Tivoli Storage Manager server:

```bash
@C IBMVAMP@E LOGON APPLID(DSMLU)@E
```

DSMLU is the application id defined by the systems programmer as discussed earlier in “VTAM Setup” on page 63. The letters preceded by the @ are action keystrokes, like clear or enter. These are explained in Installing the Clients.

4. Close all your applications and reboot your system in order for the modifications to take effect.

You are now ready to verify the adequacy of the server installation by starting up the DOS Client.

### Configuring TSO Administrative Client Using APPC

1. In the SYS1.PARMLIB dataset, create the APPC/MVS configuration members, APPCPMxx and ASCHPMxx. See Figure 23 through Figure 27.

   Note that APPCPMxx does not need to define the LU of the server application nor does it require a transaction program (TP) in the MVS APPCTP repository. This is because Tivoli Storage Manager uses the VTAM record level API rather than the APPC/MVS.

   Figure 23 shows the APPCPMxx statements used to define an APPC/MVS configuration.

```plaintext
/****
/* This is an example using APPCPMxx statements to define an */
/* APPC/MVS configuration. */
/*
/* APPCPMxx parmlib members contain startup, default, and */
/* customization values for APPC/MVS. They also contain */
/* information indicating the correspondence between */
/* logical unit(LU) names and transaction schedulers. */
/*
/* This member illustrates the use of the LUADD, LUDEL, and */
/* SIDEINFO statement types, in context. */
/****

LUADD ACBNAME(A4VAPPC) /* SPECIFY THE NAME OF THE LU TO BE */
/* added - generic LU. */
BASE /* This is the default LU for */
/* outbound requests. */
TPDATA(SYS1.APPCTP)/* Specify the TP profile repository. */
TPLEVEL(SYSTEM) /* TLEVEL(SYSTEM) is the default. */
SIDEINFO /* Specify that VSAM data set */
DATASET(SYS1.APPCSI)/* SYS1.APPCSI is the permanent */
/* repository for the side information.*/
```

**Figure 23. APPCPMxx Parmlib Member**

Figure 24 on page 71 shows the sample IDCAMS job to create the dataset SYS1.APPCTP.
Figure 25 shows the sample IDCAMS job to create the dataset SYS1.APPCSI.

```
//APPCTP EXEC PGM=IDCAMS
//SYSPRINT DD SYSOUT=*  
//SYSIN DD *  
DEFINE CLUSTER -  
  (NAME(SYS1.APPCTP) -  
  VOLUMES(JTFASH) -  
  INDEXED REUSE -  
  SHAREOPTIONS(3 3) -  
  RECORDSIZE(3824 7024) -  
  KEYS(112 0) -  
  RECORDS(300 150))
```

Figure 24. Sample JCL for TP Create (SYS1.APPCTP)

Figure 26 shows the VTAM LU definitions defined for an APPC/MVS configuration.

```
//***********  
** MVSAPPC - VTAM LU DEFINITIONS FOR APPC/MVS **  
//***********  
MVSAPPL VBUILD TYPE=APPL  
A4VAPPC APPL APPC=YES, X  
  ABCNAME=A4VAPPC, X  
  AUTOSES=0, X  
  DDRAINL=NALLOW, X  
  DRESPL=NALLOW, X  
  EAS=32, X  
  MODETAB=TPOMODE, X  
  SECACPT=CONV, X  
  SRBEXIT=YES, X  
  VERIFY=NONE
```

Figure 25. Sample JCL for SI Create (SYS1.APPCSI)

Figure 26 shows the VTAM LU definition for APPC/MVS.

```
//***********  
** MVSAPPC - VTAM LU DEFINITIONS FOR APPC/MVS **  
//***********  
MVSAPPL VBUILD TYPE=APPL  
A4VAPPC APPL APPC=YES, X  
  ABCNAME=A4VAPPC, X  
  AUTOSES=0, X  
  DDRAINL=NALLOW, X  
  DRESPL=NALLOW, X  
  EAS=32, X  
  MODETAB=TPOMODE, X  
  SECACPT=CONV, X  
  SRBEXIT=YES, X  
  VERIFY=NONE
```

Figure 26. Generic VTAM LU definition for APPC/MVS

Figure 27 on page 72 shows the ASCHPMxx statements used to define an APPC/MVS configuration.
2. Create a job for the server’s side information record in SYS1.APPCSI. See Figure 28.

```plaintext
CLASSADD CLASSNAME(A) 
    MAX(6) 
    MIN(2) 
    RESPGOAL(0.5) 
    MSGLIMIT(500)
CLASSADD CLASSNAME(FAST) 
    MAX(6) 
    MIN(2) 
    RESPGOAL(0.02) 
    MSGLIMIT(500)
CLASSADD CLASSNAME(SLOW) 
OPTIONS DEFAULT(SLOW) 
    SUBSYS(JES2) 
TPDEFAULT REGION(4M) 
    TIME(10,30) 
    MSGLEVEL(1,1) 
    OUTCLASS(X)
```

*Figure 27. ASCHPMxx Parmlib Member*

3. Insert the following lines into your TSO administrative client’s option file:

```plaintext
commethod snalu62 
symbolicdestination totivsm2 <== the name defined in MVS SI record
```

4. Create a CLIST to start the Tivoli Storage Manager TSO administrative client and name the CLIST ANSADM. See Figure 29 on page 73.

```plaintext
Figure 28. Sample Job
```
5. Ensure APPC/MVS is available before starting the Tivoli Storage Manager TSO administrative client. Then, enter the following commands:

```
S APPC, SUB=MSTR
S ASCH, SUB=MSTR
```

6. To start the TSO administrative client, enter the TSO command EX (ANSADM) or DSMADMC. For DSMADMC to execute properly, the ANSPROC procedure must have executed at TSO logon. See "Starting the TSO Administrative Client" on page 30 for information about ANSPROC.

---

**Configuring AIX SNA Server/6000 Clients Using SMIT**

**Define the Data Link Control (DLC)**

1. Select Devices.
2. Select Communication.
3. Select Token Ring Adapter.
4. Select Services.
5. Select Data Link Controls.
6. Select Add a Token Ring Data Link Control.

**Getting to SNA Server/6000 via SMIT**

1. Select Communications Application and Services.
2. Select SNA Server/6000.
3. Select Configure SNA Profiles.

**Creating the Initial Node Definition**

To create the initial node definition, follow these steps:

1. From the Configure SNA Profiles window, select Initial Node Setup.
2. Select token_ring for this configuration. The Initial Node Setup screen appears. See Figure 30 on page 74.

---

**Figure 29. Sample CLIST**

```cl
PROC 0
PROFILE PROMPT
CONTROL NOLIST NOCONLIST MSG FLUSH PROMPT
/* it is important to include the parameter "PROMPT" */
/* in the PROFILE and CONTROL statements to allow DSMADM (TSO Admin Client module) to prompt for input (e.g. PASSWORD). */
ALLOC F(DSCOPT) DA('TIVSM.TSOADMIN.OPTIONS') SHR REUSE
ALLOC F(DSCLANG) DA('TIVSM.SANSMSG(ANSMENU)') SHR REUSE
CALL 'SYS1.LINKLIB(DSMADMC)'
FREE F(DSCOPT DSCLANG )
```

---

Chapter 3. Server and Client Communications
3. Enter `c_independentlu` for the Control Point name.
4. Select `appn_end_node` for the Control Point type.
5. Enter `c_netid` for the Local Network Name.
6. Enter `vtam_xid` for the XID node ID. This is the IDBLK and IDNUM defined in the 3745 VTAMLST. This node id is essential in a cross-domain environment where the server application host machine is not the same as the host machine that the workstation is generated to.
7. The rest of the fields can be left with the defaults.
8. Press `Enter` to save your input.
9. Press `PF3` to return to the Configure SNA Profiles window.

**Note:** The Initial Node setup is similar to OS/2 CM/2 define Local Node Characteristics. This can also be done in SMIT under the Advanced Configuration/Control Point window.

**Creating the Link/Mode/Side Information**

1. Select Advanced Configuration.
2. Select Links.
3. Select Token Ring from the Token Ring Physical Units window.

**Note:** The screens in Figure 31 on page 75 and Figure 32 on page 76 are actually composite screens. You need to use Page Down and Page Up to view all of the parameters. The values that you need to change are shown in bold print.

**Token Ring SNA DLC**

1. Select Add a profile.
2. Enter a name for the profile. For example, `tok0.00001`.
3. Enter `c_independentlu` for the **Local Link Name**.

4. Under **Dynamic Link Activation Parameters**:
   a. Change **Solicit SSCP sessions** to *yes*.
   b. Change **CP-CP sessions Supported** to *no*.

5. Press **Enter** to save the profile.

6. Press **PF3** to return to the **Token Ring Physical Units** window.

### Token Ring Link Station

1. From the **Token Ring Physical Units window**, select **Token Ring Link Station**.

2. Select **Add a Profile**. There is one link-station defined per server. Use most of the default parameters.

3. Enter a name for the profile. This value can be anything and the server name can be the profile name. **BCTSO** is the name of the profile in this example.

4. Press **Enter** to create the profile. The **Add Token Ring Link Station Profile** window appears. See **Figure 32 on page 76**.
5. Place the cursor in the SNA DLC Profile name field and press PF4. Select the Token Ring SNA DLC that was created above. It is tok0.00001 in this example.

6. Under Adjacent Node Address Parameters, enter dest_addr for the Remote link address.

7. Under Link Activation Parameters, do the following:
   a. Change Solicit SSCP sessions to yes.
   b. Change Initiate call when link station is activated to yes. This denotes that this is a calling link station.
   c. Change Activate link station at SNA start up to yes.
   d. Change CP-CP sessions Supported to no.

8. Press Enter to save your changes.

9. Press PF3 until you return to the Advanced Configuration window.

Defining LU 6.2 Session
1. Select Sessions.
2. Select LU 6.2.

LU 6.2 Mode
1. Select LU 6.2 Mode.
2. Select Add a Profile.
3. Enter the profile name. You can use the same name as the mode name in the next step. See Figure 33.

Add LU 6.2 Mode Profile

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

<table>
<thead>
<tr>
<th>Entry Fields</th>
</tr>
</thead>
<tbody>
<tr>
<td>Profile name [TSMAPPC]</td>
</tr>
<tr>
<td>Mode name [TSMAPPC]</td>
</tr>
<tr>
<td>Maximum number of sessions (1-5000) [8]</td>
</tr>
<tr>
<td>Minimum contention winners (0-5000) [4]</td>
</tr>
<tr>
<td>Minimum contention losers (0-5000) [0]</td>
</tr>
<tr>
<td>Auto activate limit (0-500) [0]</td>
</tr>
<tr>
<td>Upper bound for adaptive receive pacing window [16]</td>
</tr>
<tr>
<td>Receive pacing window (0-63) [7]</td>
</tr>
<tr>
<td>Maximum RU size (128,...,32768: multiples of 32) [1024]</td>
</tr>
<tr>
<td>Minimum RU size (128,...,32768: multiples of 32) [256]</td>
</tr>
<tr>
<td>Class of Service (COS) name [#CONNECT]</td>
</tr>
</tbody>
</table>

Note: This must match the VTAM’s logmode defined in the mode table entry.

5. Press Enter to save your changes.
6. Press PF3 to return to the LU 6.2 window.

Partner LU6.2 Profile
1. From the LU 6.2 window, select LU 6.2 Partner LU.
2. Select Add a profile.
3. Enter the profile name. This name can be any value. BCTSO is used in this example. See Figure 34 on page 78.
4. Enter the *s_netid.partner_lu* for the **Fully qualified partner LU name**.
5. Enter the **Partner LU Alias**. This value can be anything.
6. Press **Enter** to save your changes.
7. Press **PF3** to return to the **LU 6.2** window.

**Partner LU 6.2 Location**

1. Select **Partner LU 6.2 Location**. This is the same as the `DEFINE_PARTNER_LU_LOCATION` statement in CM/2. It is required for any cross-domain environment.
2. Select **Add a profile**.
3. Enter the profile name. This name can be any value. **BCTSO** is used in this example.
4. Enter `s_netid.partner_lu` for the **Fully qualified partner LU name**.

5. Enter `c_netid.cp_name` for the **Fully qualified owning Control Point (CP) name**. `cp_name` must be the SSCPNAME of the workstation's network. In this environment, the SSCPNAME is `FDW`.

6. Press **Enter** to save your changes.

7. Press **PF3** until you return to the **LU 6.2** window.

**Side Information**

1. Select **LU 6.2 Side Information**.

2. Enter any name for the profile. The name that you enter here must also be the symbolic destination specified in the client's `dsm.opt` file. **BCTSO** is used in this example.
Add LU 6.2 Side Information Profile
Type or select values in entry fields.
Press Enter AFTER making all desired changes.

* Profile name
Local LU or Control Point alias
Provide only one of the following:
Partner LU alias
Fully qualified partner LU name
Mode name
Remote transaction program name (RTPN)
RTPN in hexadecimal?
Comments

F1=Help F2=Refresh F3=Cancel F4=List
Esc+S=Undo F6=Command F7=Edit F8=Image
F9=Shell F10=Exit Enter=Do

Figure 36. Add LU 6.2 Side Information Profile Window

3. Enter c_independentlu for the Local LU or Control Point alias. This can be selected from the PF4 list.
4. Enter s_netid.partner_lu for the Fully qualified partner LU name or select the Partner LU Alias name.
5. Select the Mode name from the PF4 list. This is the mode you have just created.
6. Enter the Remote transaction program name (RTPN). This can be any name. ANYTHING is used in this example.
7. Press Enter to save your changes.
8. Press PF3 until you return to the Advanced Configuration window.

Verify Configuration Profiles
1. Select Verify Configuration Profiles from the Advanced Configuration window. This can also be done from any window that has the verify option.
Starting the IBM Tivoli Storage Manager Client

1. Edit the dsm.sys file, giving the symbolic destination a value of BCTSO. For example:

   servername bctso
   commmethod snalu6.2
   symbolicdestination bctso

2. Ensure that SNA/6000 is started. This can be done by using the ‘sna -start sna’ command or via SMIT under the Manage SNA Resources window.

3. Start the Tivoli Storage Manager program.

Considerations for Using the SNA Services/6000 Client

The SNA Services/6000 setup is the same as the SNA Server/6000 setup except for one important difference—the partnerluname in the dsm.sys file specifies the “Connection Profile” name of the file that has the partner LU definition and not the actual partner LU name. This difference is attributed to the way that SNA Services/6000 implements the partner LU.

Diagnosing Initial Connection Failures

All Tivoli Storage Manager clients that use APPC issue standard CPI-C calls to communicate. A standard set of return codes apply to all clients and can be useful in diagnosing initial connection failures. The CPI-C return codes are prefixed by CM. For example, CM_PARAMETER_ERROR.

Determining CPI-C Return Codes

Tivoli Storage Manager does not write the base CPI-C return code to the Tivoli Storage Manager error log. To determine the CPI-C return code, you must run a Tivoli Storage Manager trace. To run a trace, add the following statements to the client options file (dsm.opt):
An example of the trace file is shown in Figure 38.

Tracing is active to file 'trace.out',

--
commcpic.c(3895): ConvInit set protocol stack to OS/2SAA rc: 0
commcpic.c(3929): ConvInit: Error initializing conversation to sym_dest_name SPIKE
commcpic.c(3231): CpicOpen: Error initializing conversation, rc: 24
commcpic.c(4172): CastCpicRc: Entry rc: CM_PROGRAM_PARAMETER_CHECK (24),

Figure 38. Sample Trace File

Note: IBM Tivoli Storage Manager clients write the CPI-C return information directly to the dserror.log file, eliminating the need to run the COMM trace.

Analyzing CPI-C Return Codes

Here is a list of common CPI-C errors encountered when trying to configure APPC communications for Tivoli Storage Manager. A complete list of the CPI-C return codes is documented in Common Programming Interface Communications Specifications (SC31-6180)

**CM_ALLOCATE_FAILURE_NO_RETRY**

The conversation cannot be allocated on a session because of a condition that is not temporary. Likely causes are:

- A 3174 controller is being used which does not support independent LU traffic.
- Tivoli Storage Manager is using a dependent LU. If an independent LU is defined on the workstation, ensure that the default_local_lu_alias points to an independent LU.

It is usually useful to get the sense information for these failures (see "Obtaining Sense Information" on page 83).

**CM_ALLOCATE_FAILURE_RETRY**

The conversation cannot be allocated on a session because of a condition that might be temporary. Likely causes are:

- An APPN feature has not been configured correctly on the 3174.
- Tivoli Storage Manager was unable to find the partner LU location.

It is usually useful to get the sense information for these failures (see "Obtaining Sense Information" on page 83).

**CM_TP_NOT_AVAILABLE_NO_RETRY**

The remote system rejected the allocation request because the local program specified a remote program that the remote system recognizes but cannot start. Likely causes are:

- The TSO administrative client session has not been prepared for prompting correctly. To ensure that password prompting works correctly, issue PROFILE PROMPT before invoking the client program.

**CM_PARAMETER_ERROR**
The local program issued a call specifying a parameter containing an invalid argument. Likely causes are:

- The local program attempted to use the mode named SNASVCMG or CPSVCMG.
- The partner LU alias refers to an undefined partner LU name.
- For NetWare for SAA clients, the CCON.NLM or CPIC_SAA program has not been loaded.

**CM_PROGRAM_PARAMETER_CHECK**

The local program issued a call in which a programming error has been found in one or more parameters. Ensure that the following are correct:

- Syntax of APPC options in the dsm.opt file
- Syntax of parameters in APPC configuration

### Gathering Initial Documentation for Level-2 Support

If you need to contact the support center for help, collect the following information:

- VTAM PU/LU definition for the workstation and independent LU
- VTAM mode table
- Client dsm.opt file
- Client workstation APPC definitions (see Table 12)

**Table 12. Obtaining Client Configuration Definitions**

<table>
<thead>
<tr>
<th>Product</th>
<th>Where to Look...</th>
</tr>
</thead>
<tbody>
<tr>
<td>OS/2 Communications Manager 2 (CM/2)</td>
<td>CM/2 writes configuration definitions to a file with the extension of .ndf. This file can be found in the -CMLIB subdirectory.</td>
</tr>
<tr>
<td>OS/2 Extended Services®</td>
<td>Extended Services writes configuration definitions to a file with the extension of .ndf. This file can be found in the -CMLIB-APPN subdirectory.</td>
</tr>
</tbody>
</table>
| SNA/6000             | SNA/6000 allows the user to export SMIT SNA/6000 configuration definitions to a .jfs file. To export the definitions:
  - Type SMIT SNA from a AIX command line
  - Select Configure SNA Profiles
  - Select Advanced Configuration
  - Select Export Configuration Profiles
  - Enter a filename for the export output |
| NetWare SAA          | NetWare SAA does not provide a mechanism to export SIUTIL definitions to a file. Screen captures from SIUTIL must be obtained. From the SIUTIL exec, view the side information file and capture the three main SIUTIL screens:
  - Local LU Configuration Data
  - Partner LU Configuration Data
  - Node Configuration Data
  Also obtain the PU 2.1 service profile being used by the Tivoli Storage Manager side information record. |

### Obtaining Sense Information

Often it is useful to obtain the sense information to pinpoint an error. In some specific cases, such as `CM_ALLOCATE_FAILURE_NO_RETRY`, it is necessary. Each platform offers a unique trace facility to capture this information. The following sections discuss each platform in detail.
**OS/2 CM/2**

There are two ways to obtain sense information in an OS/2 environment.

- Running CM/2 Trace Services
- Issuing CMTRACE at the command line

**Running CM/2 Trace Services:** To run CM/2 Problem Determination Aids - Trace Services, double click on the Problem Determination Aids - Trace icon in the CM/2 folder. The Problem Determination Aids - Trace Services window appears.

To start the trace, follow these steps:
1. Select **APPC** under the **APIs** column.
2. Select the DLC which your computer is using. **IBMTRNET** is used in this example.
3. Select all **Events** that begin with **APPC**.
4. Press the **Start** button.

To view the trace, follow these steps:
1. Press the **Stop all** button to stop the trace.
2. Press the **Save** button.
3. Select a filename and press the **OK** button.
4. Select **Format trace file...** from the **File** pull-down menu.
5. Check the **Output file format - Detail** box. Let all other options assume their default values.

**Issuing CMTRACE Commands:** To use CMTRACE commands to create a trace file, do the following:
1. From an OS/2 command prompt, run the **APPNT.CMD** command file shown in [Figure 39](#). This starts CMTRACE.

```
@ECHO OFF
REM ** Start traces after resetting the trace buffer
REM ** Trace APPC and services verbs, Token ring Data and
REM ** APPC events 1 2 3 4 5 and 12
REM ** event 1 = internal DLC interface
REM ** event 2 = APPC verbs
REM ** event 3 = internal APPC flows
REM ** event 4 = APPC send and receive
REM ** event 5 = XID flows
REM ** event 12 = Utility verbs such as error log entries
REM ** storage 3 uses up to three 64K segments for traces
REM ** For other options in tracing enter "CMTRACE ?"
ECHO ON
CMTRACE START -reset -api appc services -data ibmtrnet -event 1 2 3 4 5 12 -storage 3
```

*Figure 39. APPNT.CMD Command File*

2. Run the Tivoli Storage Manager command or operation you want to trace.
3. From an OS/2 command prompt, run the **APPNFCMD** command file shown in [Figure 40 on page 85](#). This stops CMTRACE and formats the trace file.
Reading the Trace File: If you used Trace Services, a detailed trace file was created with the same prefix that was chosen when the file was saved, but with an extension of .det. If you used CMTRACE at the command line, the trace file that you specified was created.

In the trace file, look for the CM_ALLOCATE_FAILURE_NO_RETRY message. Paging up from this error code reveals the sense data. For example, Sense data = 0xFFFE0113.

NetWare for SAA
The PBTRACE program is NetWare’s equivalent to the CM/2 trace facility. It can be used to determine the Primary and Secondary APPC return codes for NetWare for SAA clients.

Running PBTRACE: To run PBTRACE, follow these steps:
1. Make sure COMMEXEC is loaded by issuing the LOAD COMMEXEC command from the NetWare console.
   
   **Note:** All of the commands shown in this section should be issued from the NetWare console.

2. Issue the LOAD PB_NWSAA command.

3. Issue the CSLOAD APPCPRO to load the 2.1 service profile.

4. Issue the LOAD PBTRACE command.
   Answer yes (“Y”) to the two prompts that follow.

5. Issue the LOAD CPIC_SAA SYS:\SYSTEM\NWSAA\CPIC\MVSTIVSM.CPI command to load the side information file.

6. Issue the LOAD SYS:\TIVSM\DSMC command.

   **Note:** To stop the trace, reissue the LOAD PBTRACE command, but answer no (“N”) to the two prompts that follow.

Reading the Trace File: After completing the previous steps, the trace information is written to a file called SYS:\SYSTEM\OUTPUT.PC.

The service profile log found in the SYS:SYSTEM directory should also be obtained along with the trace. For some errors the SUBTYPE field will contain the sense code from the error.

Contact Novell or IBM support to help read the trace information.
**SNA Server/6000**

Sense information can be found in the SNA Server/6000 failure logs. For more information about SNA Server/6000 trace facilities, see *AIX SNA Server/6000: Diagnosis Guide and Messages*

**Obtaining Failure Log Information**

To obtain failure log information, follow these steps:

1. Direct the SNA Server/6000 failure log to a file by issuing the following command:

   ```
   sna -setlogs -f /var/sna/tivsm
   ```

   This directs failure messages to /var/sna/tivsm.1.

2. Recreate the failure.

3. Close the current set of logs with the command:

   ```
   sna -setlogs -t
   ```

   This closes the file /var/sna/tivsm.1 and directs failure messages to /var/sna/tivsm.2

4. Format the failure log by issuing the following command:

   ```
   trcrpt -d 27B /var/sna/tivsm.1 > /var/sna/tivsm.out
   ```

   This formats the data and writes it to a file called /var/sna/tivsm.out.

**Note:** To issue commands you must be running as *root* or as part of group *system*.

**Reading the Formatted Failure Log:** Use “vi” or any other system editor to view the log information. Look for the string Sense Code:

---

**Software Requirements**

Using APPC, you can establish communications between an MVS server and OS/2, Novell NetWare, AIX/6000, and TSO clients. Table 13 lists the software requirements for using APPC with any of the above mentioned configurations.

**Note:** Hardware adapter options are not listed since they are transparent as long as they are supported by the operating system.

**Table 13. APPC Software Requirements**

<table>
<thead>
<tr>
<th>Software</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>MVS Server</td>
<td>One of the following:</td>
</tr>
<tr>
<td></td>
<td>• OS/390 Communications Server</td>
</tr>
<tr>
<td></td>
<td>• z/OS Communications Server</td>
</tr>
<tr>
<td>IBM OS/2 or IBM OS/2 DBCS Clients</td>
<td>One of the following:</td>
</tr>
<tr>
<td></td>
<td>• IBM Communications Manager/2 Version 1.0 or later</td>
</tr>
<tr>
<td></td>
<td>• IBM OS/2 Extended Services Version 1.0 or later</td>
</tr>
<tr>
<td></td>
<td>• IBM SAA Networking Services/2</td>
</tr>
<tr>
<td>Novell NetWare Clients</td>
<td>NetWare for SAA level 1.3.52 or later (COMMEXEC level 1.3.45 or later)</td>
</tr>
</tbody>
</table>
Table 13. APPC Software Requirements (continued)

<table>
<thead>
<tr>
<th>Software</th>
<th>Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIX/6000 Clients</td>
<td><strong>Version 3.2 and above</strong></td>
</tr>
<tr>
<td></td>
<td>SNA Services/6000 Version 1.2</td>
</tr>
<tr>
<td></td>
<td><strong>Version 3.2.3 and above</strong></td>
</tr>
<tr>
<td></td>
<td>SNA Server/6000 Version 2.1</td>
</tr>
<tr>
<td>TSO Administrative clients</td>
<td>One of the following:</td>
</tr>
<tr>
<td></td>
<td>• OS/390 Communications Server</td>
</tr>
<tr>
<td></td>
<td>• z/OS Communications Server</td>
</tr>
<tr>
<td>3174 Communication Controller</td>
<td>One of the following:</td>
</tr>
<tr>
<td></td>
<td>• OS/390 Communications Server</td>
</tr>
<tr>
<td></td>
<td>• z/OS Communications Server</td>
</tr>
<tr>
<td></td>
<td>LAN Type:</td>
</tr>
<tr>
<td></td>
<td>• Token Ring (one of the following):</td>
</tr>
<tr>
<td></td>
<td>– 3174 LIC-B with T2.1 Passthru Support (RPQ 8Q0800)</td>
</tr>
<tr>
<td></td>
<td>– 3174 LIC-C3 and APPN Feature Code</td>
</tr>
<tr>
<td></td>
<td>– 3174 LIC-C5 which includes APPN Feature Code (recommended)</td>
</tr>
<tr>
<td></td>
<td>• Ethernet (one of the following):</td>
</tr>
<tr>
<td></td>
<td>– 3174 LIC-C4 and APPN Feature Code</td>
</tr>
<tr>
<td></td>
<td>– 3174 LIC-C5 which includes APPN Feature Code (recommended)</td>
</tr>
</tbody>
</table>

Results Files

This section displays the following results files:

- CM/2 .ndf File for 3174 Gateway [Figure 41 on page 88]
- CM/2 .ndf File for 3172 or 3745 Gateways [“CM/2 .ndf File for 3172 or 3745 Gateways” on page 90]
- SNA Profile for AIX Clients [“SNA Profile for AIX Clients” on page 92]
CM/2 .ndf File for 3174 Gateway

DEFINE_LOCAL_CP FQ CP_NAME(PELNET01.IMAGOS2I) >>> c_netid.c_independentlu
DESCRIPTION(ps/2 mod 95 s/n HD256) >>> Any Value
CP_ALIAS(Imagos2i)
NAU_ADDRESS(INDEPENDENT LU)
NODE_TYPE(EN)
NW_FP_SUPPORT(NONE)
HOST_FP_SUPPORT(YES)
MAX_COMP_LEVEL(NONE)
MAX_COMP_TOKENS(0);

DEFINE_CONNECTION_NETWORK FQ CN_NAME(PELNET01.LAN2AE) >>> c_netid.cp_name
ADAPTER_INFO(DLC_NAME(IBMTRNET)
ADAPTER_NUMBER(0));

DEFINE_LOGICAL_LINK LINK_NAME(LINK3174)
DESCRIPTION(Link to MVS TSM server via 3174-21L s/n KN671)
ADJACENT_NODE_TYPE(NN)
PREFERRED_NN_SERVER(YES)
DLC_NAME(IBMTRNET)
ADAPTER_NUMBER(0)
DESTINATION_ADDRESS(X'400031740671') >>> dest_addr
ETHERNET_FORMAT(NO)
CP_CP_SESSION_SUPPORT(YES)
SOLICIT_SSCP_SESSION(YES)
NODE_ID(X'05D00000') >>> vtam_xid
ACTIVATE_AT_STARTUP(YES)
USE_PUNAME_AS_CPNAME(NO)
LIMITED_RESOURCE(NO)
LINK_STATION_ROLE(USE_ADAPTER_DEFINITION)
MAX_ACTIVATION_ATTEMPTS(USE_ADAPTER_DEFINITION)
EFFECTIVE_CAPACITY(USE_ADAPTER_DEFINITION)
COST_PER_CONNECT_TIME(USE_ADAPTER_DEFINITION)
COST_PER_BYTE(USE_ADAPTER_DEFINITION)
SECURITY(USE_ADAPTER_DEFINITION)
PROPAGATION_DELAY(USE_ADAPTER_DEFINITION)
USER_DEFINED_1(USE_ADAPTER_DEFINITION)
USER_DEFINED_2(USE_ADAPTER_DEFINITION)
USER_DEFINED_3(USE_ADAPTER_DEFINITION);

DEFINE_PARTNER_LU FQ PARTNER_LU_NAME(PELNET01.DFDSMLU2) >>> s_netid.partner_lu
DESCRIPTION(TSM server on MVS)
PARTNER_LU_ALIAS(DFDSM) >>> Partner LU Alias
PARTNER_LU_UNINTERPRETED_NAME(DFDSMLU2) >>> partner_lu
MAX_MC_LL_SEND_SIZE(32767)
CONV_SECURITY_VERIFICATION(NO)
PARALLEL_SESSION_SUPPORT(YES);

Figure 41. Sample .ndf File for 3174 Gateway (Part 1 of 2)
Note: This example uses a different Tivoli Storage Manager server than does the rest of this document. See Figure 14 on page 52 for the LU definition.
CM/2 .ndf File for 3172 or 3745 Gateways

DEFINE_LOCAL_CP  FQ_CP_NAME(DEIBMFD.F13833B0)  \\
DESCRIPTION(Local Node LU definition)  \\
CP_ALIAS(F13833B0)  \\
NAU_ADDRESS(INDEPENDENT_LU)  \\
NODE_TYPE(EN)  \\
NODE_ID(X'05DF333B')  \\
HOST_FP_SUPPORT(NO);  \\

DEFINE_LOGICAL_LINK  LINK_NAME(HOST0001)  \\
DESCRIPTION(Link to adjacent SSCP-3745, partner node can be anything)  \\
FQ_ADJACENT_CP_NAME(DEIBMFD.BCTSO)  \\
ADJACENT_NODE_TYPE(LEN)  \\
DLC_NAME(IBMTRNET)  \\
ADAPTER_NUMBER(0)  \\
DESTINATION_ADDRESS(X'400010000002')  \\
CP_CP_SESSION_SUPPORT(NO)  \\
ACTIVATE_AT_STARTUP(NO)  \\
LIMITED_RESOURCE(USE_ADAPTER_DEFINITION)  \\
LINK_STATION_ROLE(USE_ADAPTER_DEFINITION)  \\
SOLICIT_SSCP_SESSION(YES)  \\
EFFECTIVE_CAPACITY(USE_ADAPTER_DEFINITION)  \\
COST_PER_CONNECT_TIME(USE_ADAPTER_DEFINITION)  \\
COST_PER_BYTE(USE_ADAPTER_DEFINITION)  \\
SECURITY(USE_ADAPTER_DEFINITION)  \\
PROPAGATION_DELAY(USE_ADAPTER_DEFINITION)  \\
USER_DEFINED_1(USE_ADAPTER_DEFINITION)  \\
USER_DEFINED_2(USE_ADAPTER_DEFINITION)  \\
USER_DEFINED_3(USE_ADAPTER_DEFINITION);  \\

DEFINE_PARTNER_LU  FQ_PARTNER_LU_NAME(DEIBMA4.A4VTSM2)  \\
DESCRIPTION(MVS TSM Server Partner LU on A4V network)  \\
PARTNER_LU_ALIAS(A4VTSM2)  \\
PARTNER_LU_UNINTERPRETED_NAME(A4VTSM2)  \\
MAX_MC_LL_SEND_SIZE(32767)  \\
CONV_SECURITY_VERIFICATION(NO)  \\
PARALLEL_SESSION_SUPPORT(YES);  \\

Figure 42. Sample .ndf File for 3172 or 3745 Gateways (Part 1 of 2)
DEFINE_PARTNER_LU_LOCATION FQ_PARTNER_LU_NAME(DEIBMA4.A4VTSM2) <<< s_netid.partner_lu
DESCRIPTION(MVS TSM Server Partner LU on A4V network)
WILDCARD_ENTRY(NO)
FQ_OWNING_CP_NAME(DEIBMFD.BCTSO) <<< c_netid.cp_name
LOCAL_NODE_NN_SERVER(NO);

DEFINE_MODE MODE_NAME(TSMAPPCC) <<< logmode
DESCRIPTION(TIVSM mode for TSMAPPCC, max RU size 2048)
COS_NAME(#BATCH)
DEFAULT_RU_SIZE(NO)
MAX_RU_SIZE_UPPER_BOUND(4096)
RECEIVE_PACING_WINDOW(7) <<< CM/2 runs on an 80386 - use 7
MAX_NEGOTIABLE_SESSION_LIMIT(16)
PLU_MODE_SESSION_LIMIT(8)
MIN_CONWINNERS_SOURCE(4);

DEFINE_DEFAULTS IMPLICIT_INBOUND_PLU_SUPPORT(YES)
DEFAULT_MODE_NAME(BLANK)
DEFAULT_MC_LL_SEND_SIZE(32767)
DIRECTORY_FOR_INBOUND_ATTACHES(*)
DEFAULT_TP_OPERATION(NONQUEUED_AM_STARTED)
DEFAULT_TP_PROGRAM_TYPE(BACKGROUND)
DEFAULT_TP_CONV_SECURITY_RQD(NO)
MAX_HELD_ALERTS(10);

DEFINE_CPIC_SIDE_INFO SYMBOLIC_DESTINATION_NAME(MVSTIVSM) <<< Symbolic Destination.
DESCRIPTION(Side info for MVS TSM server on A4V network)
PARTNER_LU_ALIAS(A4VTSM2) <<< Partner LU
MODE_NAME(#BATCH) <<< logmode
TP_NAME(DSMSERV); <<< TP Name

START_ATTACH_MANAGER;

Figure 42. Sample .ndf File for 3172 or 3745 Gateways (Part 2 of 2)
SNA Profile for AIX Clients

sna:
;prof_name = "sna"
;max_sessions = 200
;max_conversations = 200
;restart_action = once
;rrm_enabled = yes
;dynamic_inbound_partner_lu_definitions_allowed = yes
;standard_output_device = "/dev/console"
;standard_error_device = "/var/sna/sna.stderr"
;nmvt_action_when_no_nmvt_process = reject
;comments = ""
control_pt:
;prof_name = "node_cp"
;xid_node_id = 0x05df333D
;network_name = "DEIBMFD"
;control_pt_name_alias = "F13833D0"
;control_pt_name = "F13833D0"
;control_pt_node_type = appn_end_node
:max_cached_trees = 500
:max_nodes_in_topology_database = 500
:route_addition_resistance = 128
:comments = ""
partner_lu6.2:
;prof_name = "BCTSO"
;fq_partner_lu_name = "DEIBMFD.A4VTSM2"
;partner_lu_alias = "A4VTSM2"
;session_security_supp = no
;parallel_session_supp = yes
;conversation_security_level = none
;comments = ""
partner_lu6.2_location:
;prof_name = "BCTSO"
;fq_partner_lu_name = "DEIBMFD.A4VTSM2"
;fq_partner_owning_cp_name = "DEIBMFD.FDW"
;local_node_is_network_server_for_len_node = no
;fq_node_server_name = ""
;comments = ""

Figure 43. Sample SNA Profile (Part 1 of 4)
side_info:
;prof_name = "BCTSO" ; Symbolic Destination
;local_lu_or_control_pt_alias = "F13833D0" ; Partner LU Alias
;partner_lu_alias = "A4VTSM2" ;**
;fq_partner_lu_name = "TSMAPPC" ; logmode
;mode_name = "ANYTHING" ; TP Name
;remote_tp_name_in_hex = **
;remote_tp_name = **
;comments = 

link_station_token_ring:
;prof_name = "BCTSO" 
use_control_pt_xid = yes 
xid_node_id = "*"

sna_dlc_profile_name = "tok0.00001"
stop_on_inactivity = no
time_out_value = 0
LU_registration_supported = no
LU_registration_profile_name = **
link_tracing = no
trace_format = long
access_routing_type = link_address
remote_link_name = 0x400010000002 ; dest_addr
remote_link_address = 0x04
remote_sap = 0x0
verify_adjacent_node = no
net_id_of_adjacent_node = 

cp_name_of_adjacent_node = 

xid_node_id_of_adjacent_node = 

node_type_of_adjacent_node = learn
solicit_sscp_sessions = yes
call_out_on_activation = yes
activate_link_during_system_init = yes
activate_link_on_demand = no
cp_cp_sessions_supported = no
cp_cp_session_support_required = no
adjacent_node_is_preferred_server = no
initial_tg_number = 0
restart_on_normal_deactivation = no
restart_on_abnormal_deactivation = no
restart_on_activation = no

Figure 43. Sample SNA Profile (Part 2 of 4)
Figure 43. Sample SNA Profile (Part 3 of 4)

```
TG_effective_capacity  = 4300800
TG_connect_cost_per_time = 0
TG_cost_per_byte = 0
TG_security = nonsecure
TG_propagation_delay = lan
TG_user_defined_1 = 128
TG_user_defined_2 = 128
TG_user_defined_3 = 128
```

```
sna_dlc_token_ring:
  prof_name = "tok0.00001"
dataLink_device_name = "tok0"
  force_timeout = 120
  user_defined_max_i_field = no
  max_i_field_length = 30729
  max_active_link_stations = 255
  num_reserved_inbound_activation = 8
  num_reserved_outbound_activation = 8
  transmit_window_count = 16
  dynamic_window_increment = 1
  retransmit_count = 8
  receive_window_count = 8
  priority = 0
  inact_timeout = 48
  response_timeout = 4
  acknowledgement_timeout = 1
  link_name = "F13833D0"  <= c_independentlu
  local_sap = 0x04
  retry_interval = 60
  retry_limit = 20
  dynamic_link_station_supported = no
  trace_base_listen_link_station = no
  trace_base_listen_link_station_format = short
  dynamic_lnk_solicitssc_sessions = yes
  dynamic_lnk_cp_cp_sessions_supported = no
  dynamic_lnk_cp_cp_session_support_required = no
  dynamic_lnk_TG_effective_capacity = 4300800
  dynamic_lnk_TG_connect_cost_per_time = 0
  dynamic_lnk_TG_cost_per_byte = 0
  dynamic_lnk_TG_security = nonsecure
  dynamic_lnk_TG_propagation_delay = lan
  dynamic_lnk_TG_user_defined_1 = 128
  dynamic_lnk_TG_user_defined_2 = 128
  dynamic_lnk_TG_user_defined_3 = 128
  comments = ""
```

Figure 43. Sample SNA Profile (Part 4 of 4)

```
mode:
  prof_name = "TSMAPPC"
  mode_name = "TSMAPPC"  <= logmode
  max_sessions = 255
  min_conwinner_sessions = 8
  min_conloser_sessions = 8
  auto_activate_limit = 0
  max_adaptive_receive_pacing_window = 16
  receive_pacing_window = 7
  max_ru_size = 4096
  min_ru_size = 256
  class_of_service_name = 
    type = "#BATCH"
  comments = ""
```

Figure 43. Sample SNA Profile (Part 4 of 4)
Chapter 4. Customizing Your IBM Tivoli Storage Manager System

This chapter describes customizing IBM Tivoli Storage Manager by doing the following:

- “Defining Storage Pool Volumes”
- “Increasing Database and Recovery Log Sizes” on page 98
- “Using Tape Devices with IBM Tivoli Storage Manager” on page 99
- “Creating a New Policy” on page 103
- “Automating Client Operations” on page 106
- “Automating Administrative Commands” on page 107

The customization described here does not include all Tivoli Storage Manager functions. However, it does provide a flexible, powerful system that can meet most customers’ needs. If the server that you have just installed will be part of a network of IBM Tivoli Storage Manager servers, your customization tasks may be affected. For example, your server may receive configuration information from a Tivoli Storage Manager server that is designated as a configuration manager. This information could include objects such as administrator definitions, policy definitions, and server definitions. On the other hand, your server may be the configuration manager, and your definitions will be provided to a network of managed servers. In addition, you may have to define one or more other servers to your server. For details, see Administrator’s Guide.

The server must be running to perform the tasks described here. Start the server if it is not running.

In the examples performed on the administrative Web interface, the first step for all procedures is to expand Object view.

Defining Storage Pool Volumes

Before a client can back up, archive, or migrate files, you must define data sets as storage pool volumes. These are the data sets that you allocated and formatted when you ran the ANRALLO1 or ANRALLO2 job (see “Allocating the Required Server Data Sets” on page 21). Do the following to assign the data sets as volumes to the default storage pools:

OR

1. Expand Server Storage.
2. Select Storage Pools.
4. Select Volumes.

```
define volume backuppool tivsm.storage.pool001
define volume archivepool tivsm.storage.pool002
define volume spacemgpool tivsm.storage.pool003
```
5. Select **Define Disk Volume**.
6. Enter the required information and **Finish**.

Repeat these steps for each storage pool.

You can define additional storage pool volumes to Tivoli Storage Manager after you have allocated and formatted them with either ANRFMT or ANRFMT2.

---

### Increasing Database and Recovery Log Sizes

When you installed Tivoli Storage Manager, you initialized disk volumes for the database and recovery log. As part of that process, Tivoli Storage Manager defines the first database volume and first recovery log volume. At any time, you can increase the size of the database or recovery log by adding more volumes.

Before you define new volumes, allocate and format them using the ANRFMT job or the ANRFMT2 job from the ASAMPLIB dataset. See ["Allocating the Required Server Data Sets" on page 21](#) and *Administrator’s Guide* for details.

To increase the size of the database and recovery log, for example, VOLA and VOLB, do one of the following:

```
define dbvolume vola
define logvolume volb
extend db 13
extend log 9
```

**OR**

Define and extend the database volume:

1. Expand **Database**.
2. Select **Database Volumes**.
3. From **Operations**, select **Define Database Volume**.
4. Enter the required information and **Finish**.
5. Return to **Database** and from **Operations**, select **Extend**.
6. Enter the required information and **Finish**.

Define and extend the recovery log volume:

1. Select **Recovery Log**.
2. Select **Recovery Log Volumes**.
3. Select **Define Recovery Log Volumes**.
4. Enter the required information and **Finish**.
5. Return to **Recovery Log** and select **Extend**.
6. Enter the required information and **Finish**.
This section shows you how to use tape devices with your Tivoli Storage Manager system. After adding the tape devices to Tivoli Storage Manager, you can migrate data from disk storage pools to tape storage pools. This section describes the following tasks:

- “Adding Tape Devices to Your IBM Tivoli Storage Manager Environment” on page 100
- “Preparing Tape Volumes for Use” on page 100
- “Preparing Tape Volumes for LAN-free Use” on page 101
- “Creating a New Policy” on page 103
- “Creating a Client Include-Exclude List” on page 105
- “Verifying the Tape Device Environment” on page 102

If you want to use a tape management system with Tivoli Storage Manager see the Administrator’s Guide for details.

Here are some concepts that can help you to set up your tape environment:

**Storage pool migration**

To prevent disk storage pools from becoming filled with client data, you can specify that client data be automatically migrated to the tape storage pool.

A disk’s high migration threshold (default value: 90%) determines when data is migrated. The low migration threshold (default value: 70%) determines when migration stops. Thus data migration from the default backup disk storage pool begins when the pool is 90% full and continues until it is at 70% full or less.

Another default is to cache data (leave the data on the storage pool) even after the data has been migrated. Cached data stays on disk for quick access until the space is needed for new data.

See Administrator’s Guide for details.

**Mount limit**

Mount limit (the number of drives available in a device class) has a default value of 1. The mount limit should be equal to the number of drives of the same type in that library.

**Scratch volumes**

A scratch volume is a volume that is available for use. The volume is labeled, is either blank or contains no valid data, and is not defined to . You can specify the number of scratch volumes that can request for this pool (MAXSCRATCH parameter in the command or the Maximum scratch volumes field in the GUI). If you do not specify a value, no scratch volumes can be requested, and you must define each volume to be used.

**Note:** LAN-free for z/OS does not include SCRATCH mount support on the Tivoli Storage Manager Storage Agent. All SCRATCH mounts for volumes intended for use with the LAN-Free Storage Agent must complete on the Tivoli Storage Manager z/OS server.

**Collocation**

Collocation is turned off by default. Once clients begin storing data in a storage pool with collocation off, you cannot easily change the data in the storage pool so that it is collocated. To understand the advantages and disadvantages of collocation, see the Administrator’s Guide.
Adding Tape Devices to Your IBM Tivoli Storage Manager Environment

The following scenario shows how to include two IBM 3590 tape devices into the Tivoli Storage Manager environment. You must assign a device class for the type of tape devices you have and associate that device class with a storage pool:

1. Classify the devices by device type. It is helpful to choose a device class name that identifies the type of device for which it is intended (in this example, TAPECLASS).

   ```
   define devclass tapeclass devtype=3590 mountlimit=2
   ```

   OR

   a. Expand Device Classes.
   b. Select 3590 Device Classes.
   c. From Operations, select Define Device Class.
   d. Enter the device class information and Finish.

2. Define a storage pool named TAPEPOOL for the device class.

   ```
   define stgpool tapepool tapeclass -
   maxscratch=100 collocate=no
   ```

   OR

   a. Expand Storage Pools.
   b. Select Sequential Access Storage Pools.
   c. From Operations, select Define Sequential Access Storage Pool.
   d. Enter the storage pool information and Finish.

Preparing Tape Volumes for Use

All tape volumes must have standard tape labels before Tivoli Storage Manager can use them. You can use tapes as scratch volumes, up to the number of scratch volumes you specified for the storage pool. Using scratch volumes allows Tivoli Storage Manager to acquire volumes as needed.

You can also use private volumes in a storage pool. You must define any private volumes to Tivoli Storage Manager, assigning each to a specific storage pool. However, if a storage pool contains only private volumes and runs out of them, storage operations to that pool stop until more volumes are defined. Prepare tape volumes as follows:

1. Label your volumes with standard labels according to your local procedures.
2. Define any volumes that are to be used as private volumes. For example, define volume DSM001, which has standard labels:

   ```
   define volume tapepool dsm001
   ```

   OR
a. Expand Storage Pools.
b. Select Sequential Access Storage Pools.
c. Select the storage pool you want.
d. Select Volumes.
e. Select Define Sequential Access Volume.
f. Enter the volume information and Finish.

Preparing Tape Volumes for LAN-free Use

LAN-free data transfer from Tivoli Storage Manager Storage Agents is limited to volumes which have been previously written by the z/OS Tivoli Storage Manager Version 5 Release 2 server. For example, once the volume has been used to perform non-LAN-Free Backup for a given Tivoli Storage Manager client, the volume is marked as a Version 5 Release 2 volume and has completed z/OS allocation. During subsequent LAN-free volume selection, this volume would be eligible to satisfy a request by the Tivoli Storage Manager LAN-free Storage Agent for a target volume.

The TSM server supports 256KB data blocks when writing to D/T3590 tape drives. The TSM server will use 256KB blocks by default if the server detects it is running on OS/390 2.10 or above, which includes all releases of z/OS. ***the following steps TBD — one or the other***

- It is imperative that customers with new installations, migrating from TSM 4.1 (or below), or upgrading their operating system (from below 2.10 to 2.10 or above) verify that all hardware supports this capability before allowing this default. Hardware includes tape drives controllers, channels, channel extenders and any other tape interfaces that access 3590 tape drives (IBM or OEM). See the Administrator’s Guide or the Reference for more information.

- or

- Customers migrating from TSM 4.1 (or below), installing for the first time, or upgrading their operating system (from below 2.1.0 to 2.10 or above) should verify that all hardware supports this capability before allowing this default. Hardware includes tape drives controllers, channels, channel extenders and any other tape interfaces that access 3590 tape drives (IBM or OEM). See the Administrator’s Guide or the Reference for more information.

Including Tape in the Server Storage Hierarchy

Now that Tivoli Storage Manager can use your tape devices, you can update your disk storage pools so that client data can be migrated to tape. This section describes how to change BACKUPPOOL and ARCHIVEPOOL so that data migrates to TAPEPOOL.

Note: If you include a LAN-free-capable storage pool in a hierarchy with a disk storage pool, this effectively disables a LAN-free-capable storage pool from the Tivoli Storage Manager storage agents. LAN-free capable storage pools can be hierarchically associated with other LAN-free capable storage pools.

```
update stgpool backuppool nextstgpool=tapepool
update stgpool archivepool nextstgpool=tapepool
```

OR
1. Expand **Storage Pools**.
2. Select **Sequential Access Storage Pools**.
3. Select the pool to be updated.
4. Select **Update Sequential Access Storage Pool**.
5. Enter the storage pool information and **Finish**.

**Verifying the Tape Device Environment**

To verify that the tape media have been integrated into your Tivoli Storage Manager system, migrate data from a disk storage pool. Migration from a storage pool requires tape mounts. The mount messages are directed to the console message queue and to any administrative client that has been started with either the mount mode or console mode option.

Trigger migration from a disk storage pool (BACKUPPOOL, for example) by setting the high and low migration thresholds to 0:

```
update stgpool backuppool highmig=0 lowmig=0
```

After migration occurs, reset the thresholds to their original settings:

```
update stgpool backuppool highmig=90 lowmig=70
```

**OR**

To migrate data from a disk storage pool and, after migration occurs, to reset the thresholds to their original settings, update the storage pool:

1. Expand **Storage Pools**.
2. Select **Sequential Access Storage Pools**.
3. Select the pool to be updated.
4. Select **Update Sequential Access Storage Pool**.
5. Enter the storage pool information and **Finish**.

**Controlling when migration occurs**

To migrate from a disk storage pool to a tape storage pool, devices must be allocated and tapes must be mounted. For these reasons, you may want to ensure that migration occurs at a time that is best for your situation. You can control when migration occurs by leaving the high migration threshold set to 100 most of the time, and lowering it when you want migration to occur.

In the preceding step, you lowered both migration thresholds to 0 to verify that migration occurred. You may not want to empty the disk storage pool by setting the low migration threshold to 0 every time you want migration to occur. Normally, you may want to keep the low threshold at 40%, and vary the high threshold from as high as 90% to as low as 50%. See *Administrator’s Guide* for details.
Creating a New Policy

The Tivoli Storage Manager default policy specifies how Tivoli Storage Manager manages client files. For example, it specifies that Tivoli Storage Manager retains up to two backup versions of any file that exists on the client (see “Installation and Setup Results” on page x for details). Two versions may be enough for most clients. However, if some clients need the last ten versions to be kept, you can do either of the following:

- Create a new policy domain and assign these clients to that domain (described in this section).
- Create a new management class within the default policy domain. The include-exclude lists for all the affected clients must now be updated.

Storing Directly to Tape

Under the default policy, client files are stored directly to disk. You can also define policies for storing client files directly to tape. In a copy group, simply name a tape pool as the destination. Note, however, that if you store directly to tape, the number of available tape drives limits the number of client nodes that can store data at the same time.

To create a new policy, you can start by copying the policy domain, STANDARD. This operation also copies the associated policy set, management class, and copy groups. You then assign clients to the new domain.

1. Copy the default policy domain, STANDARD, to the new policy domain, NEWDOMAIN.

   ```
   copy domain standard newdomain
   ```

   OR

   a. Select Policy Domains.

   b. Select STANDARD domain.

   c. From Operations, select Copy Policy Domain.

   d. Enter the domain information and Finish.

   This operation copies the policy domain, and all associated policy sets, management classes, and copy groups. Within the policy domain named NEWDOMAIN and the policy set named STANDARD, you have:

   - Management class named STANDARD
   - Backup copy group named STANDARD
   - Archive copy group named STANDARD

   For our example, you update only the backup copy group.

2. Update the backup copy group by specifying that ten versions of backed up files are to be kept.

   ```
   update copygroup newdomain standard standard standard -
   type=backup verexists=10
   ```

   OR
a. Expand **Policy Domains**, **Policy Sets**, and then **Management Classes**.
b. Select **Backup Copy Groups**.
c. Select the **NEWDOMAIN STANDARD STANDARD STANDARD STANDARD** copy group.
d. From **Operations**, select **Update Copy Group**.
e. Enter the copy group information and **Finish**.

3. Validate and activate the **STANDARD** policy set in **NEWDOMAIN**.

```
validate policyset newdomain standard
activate policyset newdomain standard
```

**OR**

a. Expand **Policy Domains** and then select **Policy Sets**.
b. Select **NEWDOMAIN STANDARD** policy set.
c. From **Operations**, select **Validate Policy Set** and then **Finish**.
d. From **Operations**, select **Activate Policy Set** and then **Finish**.

The following conditions result in warning messages during validation:

- A destination storage pool is not a defined storage pool.
- The default management class does not contain a backup or archive copy group.
- The current ACTIVE policy set names a management class that is not defined in the policy set being validated.
- The current ACTIVE policy set contains copy groups that are not defined in the named policy set.
- A management class specifies that a backup version must exist before a file can be migrated from a client node, but the management class does not contain a backup copy group.

4. Assign client nodes to the **NEWDOMAIN** policy domain by either updating existing client nodes or registering new nodes. For example, to update client node **mercedes**, do either of the following:

```
update node mercedes domain=newdomain
```

**OR**

a. Expand **Clients**.
b. Select **Client Nodes**.
c. Select the desired node.
d. From **Operations**, select **Update this Node**.
e. Enter the node information and **Finish**.

Tivoli Storage Manager will now keep up to ten versions of backed up files for client node **mercedes** because it is assigned to the **NEWDOMAIN** policy domain.
Attention: If you associate a client that is currently running with a new domain, the client must be stopped and restarted before the new association will take effect.

Invoking Expiration Processing

Expired files are not deleted from server storage until expiration processing occurs. You can invoke expiration processing in a number of ways:

- The expiration interval server option can specify that processing be invoked at a set interval from the time the server is started. The default is a 24 hour interval.
- You can issue the EXPIRE INVENTORY command manually whenever you wish (see the following example).
- You can schedule the EXPIRE INVENTORY command to be issued regularly at a specific time (see "Automating Administrative Commands" on page 107). If you schedule expiration processing, set the expiration interval server option to 0.

```
expire inventory quiet=yes wait=no
```

OR

1. Select Server.
2. Select Server Status.
3. From Operations, select Expire Inventory.
4. Select any desired options and Finish.

Creating a Client Include-Exclude List

Any client can exclude some files from some policy operations and include other files in other operations. This is done with statements in an include-exclude list or, on UNIX clients, in an include-exclude file. For example, an include-exclude file should exclude system files that, if recovered, could corrupt the operating system. Tivoli Storage Manager server and client directories should also be excluded. See the appropriate Tivoli Storage Manager client user’s guide for details.

You can define include-exclude statements for your installation. Users can add these statements in their client options file (dsm.sys). You can also enter the statements in a set of options and assign that set to client nodes when you register or update the nodes. For details about the DEFINE CLOPTSET and DEFINE CLIENTOPT commands, see Administrator’s Guide and Administrator’s Reference.

Here are a few examples of include-exclude statements:

- A user wants all *.sct and *.drw files in the d:\eng\spec\ directory included for backup but all other files in that directory excluded. The user adds the following include-exclude statements:

```
exclude d:\eng\spec\*.*
include d:\eng\spec\*\drw
include d:\eng\spec\*\sct
```
Tivoli Storage Manager reads the statements from the bottom up until a match is found. In the preceding example, no match would be found on the include statements for the file `d:\eng\spec\proto.obj`. Tivoli Storage Manager reads the exclude statement, finds a match, and excludes the file.

- For a file or group of files, the user can also override the default management class:

  ```
  exclude d:\eng\spec\*.+
  include d:\eng\spec\*.drw monthly
  include d:\eng\spec\*.sct
  ```

  In this example,
  - `*.sct` files are bound to the default management class.
  - `*.drw` files are bound to the management class `monthly`.
  - All other files in the `spec` directory are excluded from backup or archive.

## Automating Client Operations

You can schedule most client operations, such as backup, to begin automatically. You can schedule the following on most clients:
- Tivoli Storage Manager backup, archive, restore, and retrieve operations
- Operating system commands
- Macros (files that can contain operating system and Tivoli Storage Manager commands)

This section guides you through scheduling client backups for three registered client nodes assigned to the STANDARD policy domain: **bill**, **mark**, and **mercedes**.

1. Schedule an incremental backup and associate the schedule with the clients. The schedule, named `DAILY_INCR`, is for the Tivoli Storage Manager default policy domain, named `STANDARD`. The default specifies backup to the disk storage pool `BACKUPPOOL`. This schedule calls for a schedule window that:
   - Begins on the date the schedule is defined (the default) at 11:00 p.m.
   - Lasts for 1 hour (the default)
   - Is repeated daily (the default)
   - Stays in effect indefinitely (the default)

   ```
   define schedule standard daily_incr action=incremental -
   starttime=23:00
   define association standard daily_incr bill,mark,mercedes
   ```

   **OR**

   a. Expand **Automation**.
   b. Select **Client Schedules**.
   c. From **Operations**, select **Define Schedule**.
   d. Enter the schedule information and **Finish**.
   e. Return to **Client Schedules**.
   f. Select the desired schedule.
   g. From **Operations**, select **Define Associations**.
   h. Enter the association information and **Finish**.
2. Start the client scheduler. For the schedules to become active for a workstation, a user must start the scheduler from the node.

   ```
   dsmc schedule
   ```

   To help ensure that the scheduler is running on the clients, start the client acceptor daemon (CAD) or client acceptor service.

   The include-exclude list (file on UNIX clients) on each client also affects which files are backed up or archived by the two schedules defined in the preceding steps. For example, if a file is excluded from backup with an EXCLUDE statement, the file will not be backed up when the DAILY_INCR schedule runs.

3. Because the DAILY_INCR schedule is to run daily, you can verify that it is working as it should on the day after you define the schedule and associate it with clients. If the schedule has run successfully, the status will be **Completed**.

   ```
   query event standard daily_incr begindate=today-1
   ```

   **OR**

   a. Expand **Automation**.
   b. Select **Client Schedules**.
   c. Select the desired schedule name.
   d. From **Operations**, select **Query Client Events**.
   e. Enter the required information and **Finish**.

   You can limit the query of events to display only schedules that did not run as expected. For example, you can use the following command daily to see which clients did not run the DAILY_INCR schedule the previous day:

   ```
   query event standard daily_incr begindate=today-1 - exceptionsonly=yes
   ```

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

4. Check the results of the schedule DAILY_INCR on one of the clients that was associated with that schedule. For most clients, including OS/2 clients, information about what happens when a schedule runs is stored in the file dsmsched.log. See the Clients book.

**Automating Administrative Commands**

You can automate Tivoli Storage Manager administrative tasks by scheduling administrative commands. For example, you can automate commands that need to be run regularly or that require significant processing or other system resources. In this section, you define a schedule to run expiration processing.

1. Define a schedule named EXPPROC that invokes expiration processing every night at 2:00 a.m.
This schedule calls for a schedule window that:
- Begins on the date the schedule is defined (the default) at 2:00 a.m.
- Lasts for 1 hour (the default)
- Is repeated every day
- Takes effect immediately
- Stays in effect indefinitely (the default)

```
define schedule expproc type=administrative -
cmd='expire inventory' active=yes starttime=02:00
```

OR

```
query event expproc type=administrative begindate=today-1
```

OR

```
define schedule expproc type=administrative -
cmd='expire inventory' active=yes starttime=02:00
```

OR

```
query event expproc type=administrative begindate=today-1
```

---

**Protecting IBM Tivoli Storage Manager and Client Data**

The database, recovery log, and storage pools are critical to the operation of the server. If the database or recovery log is unusable, the entire server is unavailable. If a database is lost and cannot be recovered, the backup, archive, and space-managed data for that server is lost. If a storage pool volume is lost and cannot be recovered, the data on the volume is also lost.

IBM Tivoli Storage Manager provides a number of ways to protect your data, including backing up your storage pools and database. For example, you can define schedules so that the following operations occur:
- After the initial full backup of your storage pools, incremental storage pool backups are done nightly.
- Full database backups are done weekly.
- Incremental database backups are done nightly.

In addition, disaster recovery manager (DRM), an optional feature of Tivoli Storage Manager, can assist you in many of the tasks associated with protecting and recovering your data. See the *Administrator’s Guide* for details.
Appendix A. Using Administrative Interfaces

This appendix contains the following sections that describe how to use the IBM Tivoli Storage Manager administrative interfaces:
- “Using the Administrative Web Interface”
- “Using the Administrative Client Command-Line Interface” on page 114

Using the Administrative Web Interface

You can enter IBM 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 “Starting an Administrative Client” on page 29. 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 support. See “System Requirements” on page 17 for a list of supported browsers.

IBM Tivoli Storage Manager Server Administration has four major views:
- “Operation View” on page 110
- “Network View” on page 112
- “Configuration View” on page 112
- “Object View” on page 112

The following sections contain details about each view.

Figure 44 on page 110 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>
</tbody>
</table>
| Server groups | Define, update, delete, or rename server groups
Define, delete, or move server group members
Route commands to multiple servers |
| Route a command to multiple servers | Route commands to multiple servers |

### 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>
</table>
| Configuration manager operations       | Establish this server as a configuration manager
Work with configuration profiles
Notify subscribers of changes |
| 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 |
| 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
| Administrators | Register, update, remove, rename, export, import, lock, or unlock administrators
Grant or revoke administrative privileges
Grant or revoke administrator authority to access and manage client nodes |
<table>
<thead>
<tr>
<th>Clients</th>
<th>Server</th>
<th>Database</th>
<th>Recovery Log</th>
<th>Automation</th>
<th>Policy Domains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work with client nodes:</td>
<td>View server status and modify settings</td>
<td>Define database volumes</td>
<td>Work with the recovery log</td>
<td>Define, update, rename, copy, delete, and run server command scripts</td>
<td>Define, update, delete, or copy policy domains</td>
</tr>
<tr>
<td>Register, export, or import client nodes</td>
<td>Work with server options</td>
<td>Define database copies</td>
<td>View, define, or delete</td>
<td>Define, update, activate, deactivate, and delete administrative command schedules:</td>
<td>Import or export policy domains</td>
</tr>
<tr>
<td>Query occupancy for client nodes</td>
<td>View license information, audit and register licenses</td>
<td>Define, update, or delete the database backup trigger</td>
<td>or delete recovery log volumes</td>
<td>View or delete events for administrative schedules</td>
<td>Move client nodes from one domain to another</td>
</tr>
<tr>
<td>Move node data</td>
<td>Query activity log</td>
<td>Define, update, or delete the database space trigger</td>
<td>Define, update, activate, deactivate, and delete client schedules:</td>
<td>Define, update, activate, deactivate, and delete immediate actions schedules (one-time processing of client tasks):</td>
<td>Activate or validate policy sets:</td>
</tr>
<tr>
<td>Work with file spaces</td>
<td>View or cancel active processes</td>
<td>View or delete events for client schedules</td>
<td>View or delete events for immediate actions schedules</td>
<td>Define, update, delete, or copy management classes</td>
<td>Define, update, delete, or copy policy sets</td>
</tr>
<tr>
<td>Work with backup sets</td>
<td>View or cancel active sessions</td>
<td>Define, update, or delete client schedules</td>
<td></td>
<td>Define, update, or delete copy groups</td>
<td>Activate or validate policy sets:</td>
</tr>
<tr>
<td>Work with client option sets:</td>
<td>View or cancel restartable restore sessions</td>
<td></td>
<td></td>
<td>Work with client nodes</td>
<td>Define, update, delete, or copy groups</td>
</tr>
<tr>
<td>Define client option sets</td>
<td>Query, backup, delete, or update volume history</td>
<td></td>
<td></td>
<td>Register, export, or import client nodes</td>
<td>Move client nodes from one domain to another</td>
</tr>
<tr>
<td>Define client options</td>
<td>View or define other servers</td>
<td></td>
<td></td>
<td>Query occupancy for client nodes</td>
<td>Move node data:</td>
</tr>
<tr>
<td>Work with file spaces</td>
<td>View or define server group members</td>
<td></td>
<td></td>
<td>Work with file spaces</td>
<td>Define, update, activate, deactivate, and delete client schedules:</td>
</tr>
<tr>
<td>Work with backup sets</td>
<td>Route a command to multiple servers</td>
<td></td>
<td></td>
<td>Define, update, or delete client/schedule associations</td>
<td>Define, update, or delete client/schedule associations</td>
</tr>
<tr>
<td>Work with client option sets:</td>
<td></td>
<td></td>
<td></td>
<td>View or delete events for immediate actions schedules</td>
<td>View or delete events for client schedules</td>
</tr>
</tbody>
</table>
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 B. Setting Up the Secure Web Administrator Proxy

The IBM Tivoli Storage Manager Secure Web Administrator Proxy provides a secure method for the Tivoli Storage Manager 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 IBM 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 IBM Tivoli Storage Manager servers on different platforms as shown in Figure 45.

The Web proxy connects to IBM Tivoli Storage Manager as a client, secures the connection, and retrieves Web pages or submits forms. The Tivoli Storage Manager 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 IBM Tivoli Storage Manager servers on AIX, HP-UX, Sun Solaris, Windows NT and Windows 2000, and MVS.
Note: You should not install the Web server and IBM Tivoli Storage Manager server on the same machine. To do so would be to lose the performance advantage of using the Web proxy.

- An IBM 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 IBM 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 IBM Tivoli Storage Manager.

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 17 for a list of browsers that provide this support.

Installing the Secure Web Administrator Proxy - Overview

To install the Secure Web Administrator’s Proxy, you must:
- Set up the IBM Tivoli Storage Manager Server
- Install the Web Administrator Proxy
- Use the Web Administrator Proxy

Setting Up the IBM Tivoli Storage Manager Server

Do the following on each IBM 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 IBM 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 IBM Tivoli Storage Manager system could be compromised.

2. Set the TCP/IP address (high level) and TCP port (low level) addresses of the IBM 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:

   set serverhladdress 9.115.48.123
   set serverlladdress 1500
Installing the Secure Web Administrator Proxy

The Web proxy files are on a separate CD-ROM, named *IBM Tivoli Storage Manager Secure Web Administrator Proxy*. This CD-ROM is shipped with IBM Tivoli Storage Manager. The CD-ROM also includes HTML versions of all IBM 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/

Look at 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).

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: If you have set the high and low level server addresses (see step 2 on page 116), 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 using the following commands:

   On UNIX :

   ```bash
   /opt/webserver/bin
   ```

   then type:

   ```bash
   webserverctl start
   ```

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

Moving to Another IBM 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 IBM Tivoli Storage Manager Server” on page 116).

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

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.

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. Your file permissions should be set at the default 644.
  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/tsm/swap/` directory is in `/www/tivoli/tsm/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 IBM Tivoli Storage Manager console set the server high level and low level addresses. See step 2 on page 116.

- **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?FORCETRACE&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 C. Tape Processing Considerations

This chapter contains Product-sensitive Programming Interface and Associated Guidance Information.

This chapter provides information about setting IBM Tivoli Storage Manager to use scratch tapes from the scratch pool controlled by your tape management system. Tape management systems vary, but you should use the same procedure for all:

1. Define IBM Tivoli Storage Manager to the tape management system as an external data manager, if applicable.
2. Specify to the tape management system that a Tivoli Storage Manager volume must be permanently retained.
3. Set up tape installation-wide exits

Here is a typical scenario when Tivoli Storage Manager requires a new scratch volume and requests a private mount:

1. The tape management system can then give Tivoli Storage Manager a volume from the scratch pool. However, in most installations, the operator selects the scratch volume from a list provided by the tape management system.
2. The tape management system verifies that the volume mounted is a scratch volume.
3. IBM Tivoli Storage Manager uses the volser of this tape to define the volume to the storage pool.
4. The tape label is rewritten with the expiration date from the device class (if specified) and the data set name.
5. When the tape volume becomes empty, usually due to reclamation, it is deleted from Tivoli Storage Manager. During the deletion process, the tape deletion exit is called and notifies the tape management system that it can return the tape to the scratch pool.

Defining IBM Tivoli Storage Manager to Your Tape Management System

If you are using the IBM DFSMSrmm or DFRMM tape management system products, you do not have to define IBM Tivoli Storage Manager to either of them. The Removable Media Manager supports all tape data sets, including those created by IBM Tivoli Storage Manager and DFSMSHsm.

If you are using a different tape management system product, refer to the product documentation. Defining Tivoli Storage Manager to tape management systems varies by product.

If your tape management system uses program names to identify External Data Managers, the Tivoli Storage Manager program name is ANRSERV.

Specifying Permanent Tape Retention

You might need to tell your tape management system that a volume needs to be permanently retained.
If you are using IBM’s DFSMSrmm or DFRMM tape management system products, you should define policies (vital record specifications) to cover the Tivoli Storage Manager tape data sets. A single policy specifying the Tivoli Storage Manager high level qualifier includes all Tivoli Storage Manager tape data sets.

You can retain all DFSMShsm tapes that require no movement, with the exception of tapes written by ABARS, by specifying the RMM TSO subcommands shown in following example:

\[
\begin{align*}
\text{RMM ADDVRS DSNAME('mprefix.**') COUNT(99999) OWNER(owner)} \\
\text{RMM ADDVRS DSNAME('bprefix.**') COUNT(99999) OWNER(owner)} \\
\text{RMM ADDVRS DSNAME('authid.**') COUNT(99999) OWNER(owner)}
\end{align*}
\]

where:

- **mprefix** Specifies the DFSMShsm-defined migrated data set prefix.
- **bprefix** Specifies the DFSMShsm-defined backup and dump data set prefix.
- **authid** Specifies the DFSMShsm prefix used for control data set backups.
- **COUNT(99999)** Specifies to retain all data sets that match the filter mask.
- **owner** Specifies the user ID of the individual responsible for these definitions.

For more information on defining policies, see DFSMS/MVS® DFSMSrmm Implementation and Customization Guide. For more information on vital record specifications, see DFSMSrmm Guide and Reference.

If you are using a different tape management system, one of the most commonly used ways to specify permanent tape retention is by setting up the expiration date in the device class definition within Tivoli Storage Manager. Be aware of the following when setting up the expiration date:

- The storage group to which your tape volumes belong must have this device class.
- An expiration date of 2099365 is most often used to indicate permanent retention.
- Other values can be used as long as the tape management system understands that the value used means permanent retention.

Here is an example of how to update the 3590 device class for permanent retention using the expiration date of 2099365 (December 31, 2099):

```
update devclass 3590 expiration=2099365
```

---

### Setting Up Tape Installation-Wide Exits

You must use the deletion installation-wide exit to notify your tape management system that the IBM Tivoli Storage Manager server has deleted a tape from its database. This exit can provide a tape management system with the information required to maintain an accurate inventory of Tivoli Storage Manager tapes. However, you do not have to use this exit to use tapes with Tivoli Storage Manager.
The deletion exit is called when the Tivoli Storage Manager server is returning a tape to scratch because it no longer contains valid files, and when the DELETE VOLUME command is used to delete a volume from the database. The tape volume is deleted from the Tivoli Storage Manager server database before the deletion exit is called.

The deletion exit allows your tape management system to accurately reflect the server tape usage. You need to use the tape management system facilities to notify itself that the server has deleted the tape from its database.

After the deletion exit notifies the tape management system, it returns control to the server. Tape deletions cannot be cancelled.

If you are using DFSMSrmm or DFRMM, the vital record specification policy is used to determine the management of the volume. If you are using a different tape management system, it should recognize that the volume is being managed by an external data manager (EDM). It should then ensure that only Tivoli Storage Manager has access until the volume is returned to the tape management system.

### Identifying the Deletion Exit to the Server

To use the deletion exit, specify the module in the DELETIONEXIT option in the server options file. If you are using a tape management system, specify the module name of the deletion exit provided by the tape management system. For example, if you are using the DFSMShsm ARCTVEXT module, specify:

```
deletionexit arctvext
```

EDGTVEXT, which replaced ARCTVEXT by DFSMS 1.4, can be used as the deletion exit.

### Writing the Deletion Exit

If you are using the DFSMShsm ARCTVEXT exit, the DFSMSrmm EDGTVEXT, or a deletion exit supplied with a tape management system, include the coding required for the Tivoli Storage Manager deletion exit in your existing exit. The coding considerations for this exit are the same as those for the DFSMShsm ARCTVEXT exit and the DFSMSrmm EDGTVEXT, including entry and exit linkage. A non-zero return code or abend in the exit results in an error message, but has no other effect on Tivoli Storage Manager processing.

The deletion exit must be reentrant and can run in either 24-bit or 31-bit addressing mode.

### Registers on Entry to the Deletion Exit

The registers contain the following information on entry to the deletion exit:

<table>
<thead>
<tr>
<th>Register</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The address of the parameter list passed to the exit.</td>
</tr>
<tr>
<td>13</td>
<td>The address of a 72-byte standard MVS save area.</td>
</tr>
<tr>
<td>14</td>
<td>The address to which the exit must return control.</td>
</tr>
<tr>
<td>15</td>
<td>The address of the deletion exit.</td>
</tr>
</tbody>
</table>
These registers contain nothing of use to the exit.

**Deletion Exit Parameter List**

Table 14 shows the parameter list passed to the tape deletion exit. Register 1 contains the address of this parameter list.

<table>
<thead>
<tr>
<th>Offset</th>
<th>Length (bytes)</th>
<th>Data Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (X'00')</td>
<td>4</td>
<td>Address of the data area</td>
<td>Pointer to an 8-byte data area containing information about the volume the server has deleted from its database. Table 15 shows the format of the data area.</td>
</tr>
<tr>
<td>4 (X'04')</td>
<td>4</td>
<td>Address of the return code</td>
<td>The address of a full word containing the return code that the exit must set after completing processing. The return code is binary, and should be 0 if processing is successful, or any other number if processing is unsuccessful. Tivoli Storage Manager generates an error message if processing is unsuccessful. The high order bit of the return code address is set to 1.</td>
</tr>
</tbody>
</table>

Table 15 shows the format of the data area pointed to by the deletion exit parameter list.

<table>
<thead>
<tr>
<th>Offset</th>
<th>Length</th>
<th>Data Type or Bit Pattern</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (X'00')</td>
<td>6</td>
<td>Character</td>
<td>The volume serial number of the tape volume deleted from the database</td>
</tr>
<tr>
<td>6 (X'06')</td>
<td>2</td>
<td>Binary</td>
<td>Informational flags</td>
</tr>
<tr>
<td>.... .... ....</td>
<td></td>
<td>1... .... ....</td>
<td>The tape volume is purged from the server’s database.</td>
</tr>
<tr>
<td>.... .... ....</td>
<td></td>
<td>.1... .... ....</td>
<td>The server has protected the files on the volume with expiration dates. This information is determined from the device class associated with the volume. <strong>Note:</strong> If the expiration or retention information on the device class has changed after the volume was first used, this informational flag may be incorrect.</td>
</tr>
<tr>
<td>.... .... 1... ....</td>
<td></td>
<td>The DFSMSHsm SCRATCHTAPE option was used on the SETSYS TAPEDELETION command for this tape category.</td>
<td></td>
</tr>
<tr>
<td>.... .... .... .1.</td>
<td></td>
<td>This is a backup tape.</td>
<td></td>
</tr>
</tbody>
</table>

**Registers on Exit from the Deletion Exit**

When you return control to the server, restore the registers to the values they had on entry.
Appendix D. Where to Look for Information

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

Contacting Customer Support

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

- Submit a problem management record (PMR) electronically at IBMSERV/IBMLINK. You can access IBMLINK at www.ibm.com/ibmlink/.

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

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

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

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

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

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

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

We are very interested in hearing about your experience with Tivoli products and documentation. We also welcome your suggestions for improvements. If you have comments or suggestions about our documentation, please complete our customer feedback survey at www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html by selecting the Feedback link in the left navigation bar.
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 Tivoli Storage Manager command line.
- The Tivoli Storage Manager client version, release, modification, and service level number. You can get this information by entering dsmc at the command line.
- The communication protocol (for example, TCP/IP), version, and release number you are using.
- The activity you were doing when the problem occurred, listing the steps you followed before the problem occurred.
- The exact text of any error messages.

Internet

You can get additional information through an anonymous FTP server, [ftp://ftp.software.ibm.com]. IBM Tivoli Storage Manager information is in the /storage/tivoli-storage-management directory.

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

IBM Tivoli Storage Manager Publications

The following table lists Tivoli Storage Manager server publications.

<table>
<thead>
<tr>
<th>Publication Title</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM Tivoli Storage Manager Messages</td>
<td>GC32-0767</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for OS/390 and z/OS Administrator’s Guide</td>
<td>GC32-0775</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for OS/390 and z/OS Administrator’s Reference</td>
<td>GC32-0776</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for OS/390 and z/OS Quick Start</td>
<td>GC32-0777</td>
</tr>
</tbody>
</table>

The following table lists Tivoli Storage Manager storage agent publications.

<table>
<thead>
<tr>
<th>Publication Title</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM Tivoli Storage Manager for AIX Storage Agent User’s Guide</td>
<td>GC32-0771</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for HP-UX Storage Agent User’s Guide</td>
<td>GC32-0727</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Linux Storage Agent User’s Guide</td>
<td>GC23-4693</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Sun Solaris Storage Agent User’s Guide</td>
<td>GC32-0781</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Windows Storage Agent User’s Guide</td>
<td>GC32-0785</td>
</tr>
</tbody>
</table>

The following table lists Tivoli Storage Manager client publications.

<table>
<thead>
<tr>
<th>Publication Title</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM Tivoli Storage Manager for Space Management for UNIX: Using the Hierarchical Storage Management Clients</td>
<td>GC32-0794</td>
</tr>
</tbody>
</table>
The following table lists publications for application protection products.

<table>
<thead>
<tr>
<th>Publication Title</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM Tivoli Storage Manager for Application Servers: Data Protection for WebSphere Application Server Installation and User’s Guide</td>
<td>SC32-9075</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Databases: Data Protection for Microsoft SQL Server Installation and User’s Guide</td>
<td>SC32-9059</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Databases: Data Protection for Oracle for UNIX Installation and User’s Guide</td>
<td>SC32-9064</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Databases: Data Protection for Oracle for Windows Installation and User’s Guide</td>
<td>SC32-9065</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Databases: Data Protection for Informix Installation and User’s Guide</td>
<td>SH26-4095</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Hardware: Data Protection for EMC Symmetrix for R/3 Installation and User’s Guide</td>
<td>SC33-6386</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Hardware: Data Protection for Enterprise Storage Server Databases (DB2 UDB) Installation and User’s Guide</td>
<td>SC32-9060</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Hardware: Data Protection for Enterprise Storage Server Databases (Oracle) Installation and User’s Guide</td>
<td>SC32-9061</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Hardware: Data Protection for IBM ESS for R/3 Installation and User’s Guide for DB2 UDB</td>
<td>SC33-8204</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Hardware: Data Protection for IBM ESS for R/3 Installation and User’s Guide for Oracle</td>
<td>SC33-8205</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Mail: Data Protection for Lotus Domino for UNIX and OS/400 Installation and User’s Guide</td>
<td>SC32-9056</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Mail: Data Protection for Lotus Domino for Windows Installation</td>
<td>SC32-9057</td>
</tr>
<tr>
<td>IBM Tivoli Storage Manager for Mail: Data Protection for Microsoft Exchange Server Installation and User’s Guide</td>
<td>SC32-9058</td>
</tr>
</tbody>
</table>
### Referenced OS/390 and z/OS™ System Publications

The following table lists referenced OS/390 and z/OS publications.

<table>
<thead>
<tr>
<th>Publication Title</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>DFSMS/MVS DFSMSrmm Guide and Reference</td>
<td>SC26-4931</td>
</tr>
<tr>
<td>DFSMS/MVS DFSMSrmm Implementation and Customization Guide</td>
<td>SC26-4932</td>
</tr>
<tr>
<td>z/OS SecureWay Security Server RACF Security Administrator’s Guide</td>
<td>SA22-7683</td>
</tr>
</tbody>
</table>

### Related IBM Hardware Products Publications

The following table lists related IBM hardware products publications.

<table>
<thead>
<tr>
<th>Title</th>
<th>Order Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBM Magstar 3494 Tape Library Introduction and Planning Guide</td>
<td>GA32-0279</td>
</tr>
<tr>
<td>IBM 3490E Model E01 and E11 User’s Guide</td>
<td>GA32-0298</td>
</tr>
<tr>
<td>IBM 3495 Tape Library Dataserver Models L20, L30, L40, and L50 Operator’s Guide</td>
<td>GA32-0235</td>
</tr>
<tr>
<td>IBM TotalStorage Enterprise Tape System 3590 Operator Guide</td>
<td>GA32-0330</td>
</tr>
<tr>
<td>IBM Magstar 3494 Tape Library Dataserver Operator Guide</td>
<td>GA32-0280</td>
</tr>
</tbody>
</table>

### IBM Redbooks

The International Technical Support Center (ITSC) publishes redbooks, which are books on specialized topics, such as Using Tivoli Storage Manager 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 Tivoli Storage Manager 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.
Appendix E. Notices

This information was developed for products and services offered in the U.S.A. IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user’s responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

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### A

**absolute mode.** A backup copy group mode 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 IBM 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 client.** A program that runs on a file server, workstation, or mainframe that administrators use to control and monitor the IBM Tivoli Storage Manager server. Contrast with backup-archive client.

**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 IBM Tivoli Storage Manager data protection programs installed on a system to protect an application. The IBM 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 archived files. An archive copy group belongs to a management class.

**archive retention grace period.** The number of days that IBM Tivoli Storage Manager retains an archived file 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. IBM Tivoli Storage Manager can audit volumes, the database, libraries, and licenses. For example, when IBM 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 IBM 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 or the recovery log. This space can be used to extend the capacity of the database or the recovery log, or to provide sufficient free space before a volume is deleted from the database or the 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 IBM 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 of a file 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 an IBM Tivoli Storage Manager server: administrative client, application client, API client, backup-archive client, and HSM client (also known as Tivoli Storage Manager for Space Management).

**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 IBM 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 IBM 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 IBM Tivoli Storage Manager server that distributes configuration information to other IBM 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 IBM 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 IBM Tivoli Storage Manager database 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.

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 IBM 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 IBM Tivoli Storage Manager servers, defined libraries and drives. The file can be created by using an IBM 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 IBM Tivoli Storage Manager database.

**disaster recovery manager (DRM).** A function in IBM Tivoli Storage Manager that assists in preparing and later using a disaster recovery plan file for the IBM Tivoli Storage Manager server.

**disaster recovery plan.** A file created by 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 IBM Tivoli Storage Manager server, and the location of recovery media.

**domain.** See policy domain or client domain.

**DRM.** A short name for disaster recovery manager.

**dsm.opt file.** See client options file and client user options file.

**dmserv.opt.** See server options file.

**dsm.sys file.** See client system options file.

**dynamic.** A value for serialization that specifies that IBM 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 IBM 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 IBM 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 IBM Tivoli Storage Manager scheduling. (2) A message that an IBM Tivoli Storage Manager server or client issues. Messages can be logged using IBM 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 IBM Tivoli Storage Manager based on the criteria defined in the backup or archive copy group.

**expiration date.** On some IBM Tivoli Storage Manager servers, a device class attribute used to notify tape management systems of the date when IBM 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, or directly to another server. 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.
file space. A logical space in IBM 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 IBM Tivoli Storage Manager server storage. IBM 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 the original content of the file because IBM Tivoli Storage Manager backed up or archived the file while the file was being modified.

hierarchical storage management (HSM) client. The Tivoli Storage Manager for Space Management program that runs on workstations to allow users to maintain free space on their workstations by migrating and recalling files to and from IBM 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.

IBM Tivoli Storage Manager command script. A sequence of IBM Tivoli Storage Manager administrative commands that are stored in the database of the IBM Tivoli Storage Manager server. You can run the script from any interface to the server. The script can include substitution for command parameters and conditional logic.

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. A file containing statements that IBM 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 IBM 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 client options file, from separate include-exclude files, 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.

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 IBM 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. An IBM Tivoli Storage Manager server that uses server-to-server communication to access a library that is managed by another IBM Tivoli Storage Manager server. See also library manager.

library manager. An IBM Tivoli Storage Manager server that controls device operations when multiple IBM 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 file system. (2) For the IBM Tivoli Storage Manager server, the combined space on all disks assigned to the server. The space 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 IBM Tivoli Storage Manager administrative commands, which can be run only from an administrative client by using the MACRO command. Contrast with IBM 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. An IBM 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 IBM 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 the recovery log.

maximum reduction. Specifies the maximum amount of storage space, in megabytes, that you can reduce the database or the recovery log.

maximum utilization. The highest percentage of assigned capacity used by the database or the 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 the 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.
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.

O

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.

P

page. A unit of space allocation within IBM Tivoli Storage Manager database volumes.

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, 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, IBM Tivoli Storage Manager command scripts, server definitions, and server group definitions. See configuration manager and managed server.

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 IBM Tivoli Storage Manager server console and activity log. See also event.

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 the 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.

restore. To copy information from its backup location to the active storage location for use. In IBM Tivoli Storage Manager, you can restore the server database, storage pools, storage pool volumes, and users’ backed-up files. The backup version of a file 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, IBM 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 copy in the storage pool is not affected by the retrieve operation. Contrast with archive.

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. IBM 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 IBM Tivoli Storage Manager, and that is available for use.

script. See IBM 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 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. IBM Tivoli Storage Manager retries the backup or archive operation a number of times; if the file is being modified during each attempt, IBM 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 IBM 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. IBM Tivoli Storage Manager retries the backup or archive operation a number of times; if the file is being modified during each attempt, IBM 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 Storage Manager for Space Management 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. IBM Tivoli Storage Manager does not retry the operation. See also serialization. Contrast with dynamic, shared dynamic, and static.

storage agent. A program that enables IBM 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 IBM 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 IBM 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, the 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 Storage Manager for Space Management.

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.

T

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.

U

UCS-2. An ISO/IEC 10646 encoding form, Universal Character Set coded in 2 octets. The IBM 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.

**UTF-8.** Unicode transformation format - 8. A byte-oriented encoding form specified by the Unicode Standard.

**v**

**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 IBM 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 IBM Tivoli Storage Manager database.
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