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Proof of Concept Guide for IBM Tivoli Storage Manager (ITSM)
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The primary objective of this IBM® Redbook is to provide step-by-step instructions about how to set up a stand-alone IBM Tivoli® Storage Manager (ITSM) environment to be used for demonstrating the functions and features of the products, using customer data and mapping customer infrastructure and workloads.

General knowledge is assumed of communication network architecture and design, basic sizing of IBM Tivoli Storage Manager database, and basic pool management of Tivoli Storage Manager servers.

This document is intended to be read and used by pre-sales systems engineers and services personnel to build customized demonstrations of the IBM Tivoli Storage Manager. A significant amount of knowledge of IBM Tivoli Storage Manager is expected, and the reader should ideally have attended the IBM Tivoli Storage Manager basic and advanced training classes.

The reader should be familiar with the following topics:

- Storage management concepts
- Network topologies
- Distributed systems architectures and configuration

This redbook is a valuable addition to the existing product documentation and can be read in conjunction with it. See the “Related publications” on page 125 for the entire list of the documents.

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Introduction to IBM Tivoli Storage Manager

In this chapter we provide an overview of IBM Tivoli Storage Manager concepts. This includes a high-level technical introduction to IBM Tivoli Storage Manager, its architecture, and base concepts. The following topics are discussed:

- IBM Tivoli Storage Manager overview
- IBM Tivoli Storage Manager architecture
- Features of IBM Tivoli Storage Manager, Extended Edition
- IBM Tivoli Storage Manager Data protection family
- New features that come with Version 5.3
1.1 IBM Tivoli Storage Manager

IBM Tivoli Storage Manager, now a part of the IBM TotalStorage Open Software Family, is a strong management application built for the enterprise. IBM Tivoli Storage Manager provides a solution for data protection, archiving, disaster recovery planning, space management, database and application protection bare machine recovery, and record retention. The product also automates storage management tasks by eliminating labor-intensive and cost-intensive manual procedures for backup, archive, and recovery.

1.1.1 IBM Tivoli Storage Manager overview

IBM Tivoli Storage Manager is the core product of the IBM Tivoli Storage Management product set. It provides a solution for distributed data and storage management in an enterprise network environment. IBM Tivoli Storage Manager protects and manages data from more than 13 operating system platforms, covering mobile, desktop, and server systems over the entire distributed world. It supports hundreds of storage devices (including disk, tape, and optical) as well as LAN, WAN, and SAN infrastructures.

The base functions provided by IBM Tivoli Storage Manager and its complementary products are as follows:

- Data protection (periodic backup and restore as well as disaster recovery):
  - In operational backup and restore of data, the backup process creates a copy of the data to protect against the operational loss or destruction of file or application data. The customer defines how often to back up (frequency) and how many numbers of copies (versions) to hold.
  - The restore process places the backup copy of the data back into a customer-designated system or workstation.
  - Disaster recovery means all activities required to organize, manage, and automate the recovery process from a major loss of IT infrastructure and data across the enterprise. It includes processes to move data offsite into a secure vault location, to rebuild IT infrastructure, and to reload data successfully in an acceptable time frame.

- Data resource management (vital record retention, archive, and retrieval):
  - The archive process creates a copy of a file or a set of files representing an end point of a process for long term storage. Files can remain on the local storage media or can be deleted. The customer controls how long (via the retention period) an archive copy is to be retained.
  - The retrieval process locates the copies within the archival storage and places them back into a customer-designated system or workstation.
Space management (or hierarchical storage management):

This process provides the automatic and transparent movement of operational data from the user system disk space to a central storage repository. If the user accesses this data, it is dynamically and transparently restored to the client storage.

The solution is network based, which means that these functions are available to the whole network environment. Administration costs are minimized by centralization of all of the management of IBM Tivoli Storage Manager components.

1.1.2 IBM Tivoli Storage Manager architecture

IBM Tivoli Storage Manager is a client server architecture as seen in Figure 1-1.

IBM Tivoli Storage Manager clients are the workstations, file servers, mobile computers, and other machines in a customer’s environment that need to have their data protected. IBM Tivoli Storage Manager client software is installed on these machines.

IBM Tivoli Storage Manager server is the “brains” of backup and archive. It has a unique architecture that empowers it. It is based on a relational database and transaction log. The database and transaction log track meta data, what is backed up, where it is stored, what are the policies, schedules, administrators.
The transaction log enables a two-phase commit, which not only protects the integrity of the database, but also allows for interrupted backups and restores to be restarted. The relational database empowers IBM Tivoli Storage Manager to perform tasks that are not possible when you use a flat file master catalog to track meta data. For example, the relational database can:

- Move data from one type of storage pool to another
- Retroactively update backed-up data when a policy changes
- Track files down to the file level
- Schedule any type of client or administrative process
- Reclaim expired dead space on tapes.

The IBM Tivoli Storage Manager client sends its data to the IBM Tivoli Storage Manager server either by the LAN or by the SAN. Most backups occur through schedules, but clients are can perform on-demand backups whenever they want. Clients are can also perform their own restores. Tivoli Storage Manager has a new Administration Center that comes with V5.3 and can be installed either on the same machine with Tivoli Storage Manager server or on a separate machine.

The actual data that the client sends over is stored in the storage pools. IBM Tivoli Storage Manager is unique in the fact that the storage pools can form a storage hierarchy made up of any of the over 500 devices that are supported. This allows for flexibility and longevity. Most importantly, this structure allows for fast backups and fast restores.

Most businesses will back up their data initially to disk storage. This allows for hundreds of clients to back up at the same time. Then, based on policies, the data migrates in a fashion that expedites restores to tape or CD. When the data migrates, all the data belonging to one client is moved together to the next pool. By keeping all that data together, restores are faster because not as much tape positioning is needed. This migration process can also accommodate movement to collocated tapes, which further expedite restores by just having one user's data on them.

The environment can be firewall protected, and you will still want to be able to use the GUI interfaces of an IBM Tivoli Storage Manager client. IBM Tivoli Storage Manager allows individual configuration of nearly every TCP port that it uses for communication:

- TCP/IP port:
  To enable the Backup/Archive client, command line Administrative Client, and the scheduler to run outside a firewall, the port specified by the tcpport server option must be opened by the firewall administrator. This port is set on the client and the server using the tcpport option. The setting must be the same on the client and server. The default TCP/IP port is 1500.
TCP/IP ports for the remote workstation:

The two TCP/IP ports for the remote workstation client must be opened. Use the `webports` option in the remote workstations option file to specify these ports. If you do not specify the values for the `webports` option, the default zero (0) causes TCP/IP to randomly assign two free port numbers.

### 1.1.3 IBM Tivoli Storage Manager server

One of the principal architectural components of the IBM Tivoli Storage Manager server is its built-relational database. The IBM Tivoli Storage Manager database was especially designed for the task of managing data, and it implements zero-touch administration.

All policy information, logging, authentication and security, media management, and object inventory are managed through this database.

Most of the fields are externalized through IBM Tivoli Storage Manager high level administration commands, SQL `SELECT` statements, or for reporting purposes, by using an ODBC driver. Obviously, this database is fully protected with software mirroring, roll-forward capability, and its own management and online backup and restore functions.

For storing the managed data, the IBM Tivoli Storage Manager server manages a storage repository. The storage repository can be implemented in a hierarchy using any combination of supported media or magnetic or optical disk, tape, and robotic storage devices, which are locally connected to the server system or which are accessible through a SAN. To take advantage of SAN technology, the IBM Tivoli Storage Manager server has features implemented to dynamically share SAN-connected, automated tape library systems among multiple IBM Tivoli Storage Manager servers, as well as providing (as an option), LAN-free and server-free backup.

### 1.1.4 IBM Tivoli Storage Manager Backup/Archive client

Data is sent to the IBM Tivoli Storage Manager server using the IBM Tivoli Storage Manager Backup/Archive client and complementary Tivoli and non-IBM/Tivoli products. These products work together with the IBM Tivoli Storage Manager server base product to ensure that the data you need to store is managed as defined.

The IBM Tivoli Storage Manager Backup/Archive client, included with the server, provides the operational backup and archival function. The client implements the patented progressive backup methodology, adaptive sub-file backup technology, and unique record retention methods for backup and archive functions.
The Backup/Archive clients are implemented as multi-session clients, which means that they are able to take advantage of the multi-threading capabilities of modern operating systems.

### 1.1.5 IBM Tivoli Storage Manager storage agent

The IBM Tivoli Storage Manager storage agent supports LAN-free backup solutions using a SAN infrastructure. The storage agent dynamically shares SAN connected tape libraries and disks with the IBM Tivoli Storage Manager server, and it has the ability to write and read large amount of client data directly to and from server-owned storage media. This gives a great opportunity for lowering the backup window, reducing the traffic on the LAN and reducing the utilization of the TSM server.

### 1.1.6 IBM Tivoli Storage Manager Extended edition

The Extended Edition of IBM Tivoli Storage Manager expands on the features and possibilities of the Basic Edition described in the previous section.

IBM Tivoli Storage Manager, Extended Edition expands on the data backup and restore and the managed data archive and retrieve capabilities of the basic IBM Tivoli Storage Manager by adding disaster planning capability, Network Data Management Protocol (NDMP) control for network-attached storage (NAS) filers and support for large tape libraries.

**Disaster Recovery Manager**

Disaster Recovery Manager (DRM) is a feature of the IBM Tivoli Storage Manager, Extended Edition. It coordinates and automates the process of recovering from a disaster. It provides for extended offsite media management, automated restore of the IBM Tivoli Storage Manager server, and managed client recovery. It complements the already implemented robust protection features of IBM Tivoli Storage Manager and automates many already facilitated protection functions.

DRM automatically captures information required to recover the IBM Tivoli Storage Manager server after a disaster. It assists in preparing a plan that allows recovery in the most expedient manner. This disaster recovery plan contains information, scripts, and procedures needed to automate server restoration and helps ensure quick recovery of data after a disaster.

DRM also manages and tracks the movement of off-site media to reduce the time required to recover in the event of a disaster. It is able to track media that are stored on-site, in-transit, or off-site in a vault, no matter whether it is a manual or electronic vault, so your data can be easily located if disaster strikes.
Disaster recovery planning
This facilitates even more detailed tracking of the additional copies of your backed-up, archived, and space managed data that IBM Tivoli Storage Manager creates for safekeeping at an offsite location. IBM Tivoli Storage Manager Extended Edition also prepares and keeps up to date a text file with detailed recovery steps and automated computer-scripts — the “recovery plan”. Should a disaster strike and destroy your storage and computers, this plan and the offsite data copies will get your business back up and running quickly.

NDMP support for Network Attached Storage
IBM Tivoli Storage Manager Extended Edition uses Network Data Management Protocol (NDMP) to perform high-performance, scalable backups and restores. The backups and restores minimize network traffic and transfer data outboard of the Tivoli Storage Manager client and server.

IBM Tivoli Storage Manager currently offers the ability to back up and restore data on NAS devices that support NDMP version 3.0. Full or differential backups can be performed at a directory or filesystem level, including snapshots that are stored as either filesystems or subdirectories. Restores can be performed of an entire file system or selected files/directories within the file system. Multiple backup and restore operations can be performed in parallel.

Currently, NDMP for full or differential backups can be performed at a directory or filesystem level, including snapshots that are stored as either filesystems or subdirectories to a Tivoli Storage Manager server running on AIX, Sun Solaris, HP-UX, Linux, or Windows®. This uses NDMP to back up a full file system image and to restore an entire file system image. Once a full backup image has been created, subsequent backups can be differential images. A differential image consists of all the files that have changed since the previous full image backup. The restore of a differential image automatically restores the differential image after the appropriate full image has been restored. Backup and restore operations can be scheduled using the administrative command scheduler.

During backup and restore operations, data flows directly between the tape drive and the Network Attached Storage (NAS) appliance. NDMP operations can be performed using SCSI or ACSLS tape libraries. Additionally, 349X tape libraries may be used with some NAS devices. Refer to the Tivoli Storage Manager device support Web page and your NAS vendor's documentation for complete NDMP device support. NDMP for NAS backup works with either a SCSI-attached tape device local to the NAS appliance, or with a SAN-attached SCSI or ACSLS device that can be shared with the Storage Manager server. Drives must be supported by both the NAS appliance and the NAS operating system. Drives can be dedicated to NDMP operations from a single NAS file server or can be shared. Multiple NAS appliances can share tape resources if they have FC access to the drive and if backups are performed via the same Storage Manager
server. Depending on the configuration, drives can be shared with LAN-free backup/restore operations.

**Database and application on-line protection**
This feature protects a wide range of application data via the protection of the underlying databases and application management systems holding that data. This module automates data protection tasks and allows database and application servers to continue running their primary applications while they backup and restore data to and from offline storage.

**Data retention**
IBM Tivoli Storage Manager for Data Retention facilitates compliance with the most stringent regulatory requirements in the most flexible and function-rich manner. It helps manage and simplify the retrieval of the ever increasing amount of data that organizations must retain for strict records retention regulations. Many of the regulations demand the archiving of records, e-mails, design documents, and other data for many years, in addition to requiring that the data is not changed or deleted.

**Bare Machine Recovery**
This feature backs up and automatically restores the operating system structures necessary to rebuild the operating system, as well as data files. It schedules regular operating system backups so a recovery brings back the latest information.

### 1.2 IBM Tivoli Storage Manager complementary products

IBM Tivoli Storage Manager can be integrated with several optional applications that together form a powerful integrated storage management solution. These include:

- IBM Tivoli Storage Manager for Space Management
- IBM Tivoli Storage Manager for Storage Area Networks
- IBM Tivoli Storage Manager for System Backup and Recovery
- IBM Tivoli Storage Manager for Data Protection product family

### 1.2.1 IBM Tivoli Storage Manager for Space Management

IBM Tivoli Storage Manager for Space Management provides hierarchical storage management to automatically migrate rarely accessed files to alternate storage without disrupting the most frequently used files in local storage.
Migrated files are automatically and transparently recalled to primary storage when needed by applications or users, freeing administrators and users from manual filing tasks.

Suppose that a certain percentage of your data is inactive and has not been accessed in weeks or months. If so, IBM Tivoli Storage Manager for Space Management (formerly known as hierarchical storage management, or HSM) can automatically move inactive data to less-expensive offline storage or near-line storage, freeing online disk space for more important active data. It migrates the files and recalls them automatically when they are needed.

1.2.2 IBM Tivoli Storage Manager for Storage Area Network

IBM Tivoli Storage Manager for Storage Area Network enables your SAN-connected IBM Tivoli Storage Manager servers and client computers to make maximum use of their direct network connection to storage. This software extension enables both servers and client computers to make the bulk of their backup/restore and archive/retrieve data transfers over the SAN instead of the LAN, either directly to tape or to the IBM Tivoli Storage Manager disk storage pool. This ability greatly reduces the impact of data protection on the LAN while also reducing CPU utilization on both client and server.

The core functions of IBM Tivoli Storage Manager for Storage Area Network are:

- LAN-free backup/restore
- SAN-connected tape library

1.2.3 IBM Tivoli Storage Manager for backup and recovery

IBM Tivoli Storage Manager for System Backup and Recovery (SysBack™) provides a flexible backup method for AIX systems to help protect data and provide bare machine recovery capabilities. It offers a comprehensive system backup, restore, and reinstallation tool. SysBack is a simple-to-use, yet highly effective, tool. Any feature may be executed from either the AIX command line or by using the SMIT menu interface.

For Windows platforms, bare machine recovery can be achieved with the TSM Backup/Archive client’s Automated System Recovery capability.

In addition, Windows, Sun, and Linux bare machine recovery can be done with Cristie Bare Machine Recovery. This integrates directly with Tivoli Storage Manager to provide operating system recovery for these platforms.
1.2.4 IBM Tivoli Storage Manager for Data protection

IBM Tivoli Storage Manager provides data protection for a wide variety of applications, databases, mail, and hardware, ensuring that data is safe and secure no matter where it is located or how it is stored. These products interface directly with the applications using their backup-certified utilities and interfaces, simplifying online backup and restore procedures. These products are described in the following sections.

IBM Tivoli Storage Manager for Application Servers
IBM Tivoli Storage Manager for Application Servers (formerly Tivoli Data Protection for WebSphere® Application Servers) is a software module that works with IBM Tivoli Storage Manager to better protect the infrastructure and application data and improve the availability of WebSphere Application Servers.

IBM Tivoli Storage Manager for Databases
IBM Tivoli Storage Manager for Databases is a software module designed to work with IBM Tivoli Storage Manager to protect a wide range of application data through the protection of the underlying database management systems holding that data. IBM Tivoli Storage Manager for Databases exploits the various backup-certified utilities and interfaces provided for Oracle, Microsoft® SQL Server, and Informix®.

This same functionality is included in the IBM DB2 Universal Database package and Informix Dynamic Server, enabling them to work directly with IBM Tivoli Storage Manager without the need to buy any additional modules.

IBM Tivoli Storage Manager for Hardware
IBM Tivoli Storage Manager for Hardware improves the data protection of business-critical databases and Enterprise Resource Planning (ERP) applications that require 24x7 availability.

IBM Tivoli Storage Manager for Mail
IBM Tivoli Storage Manager for Mail is a software module for IBM Tivoli Storage Manager that automates the data protection of e-mail servers running either Lotus® Domino® or Microsoft Exchange. This module utilizes the APIs provided by e-mail application vendors to perform online backups without shutting down the e-mail server and improve data-restore performance. As a result, it can help protect the growing amount of new and changing data that should be securely backed up to help maintain Domino and Exchange application availability 24x7x365.
IBM Tivoli Storage Manager for Enterprise Resource Planning
IBM Tivoli Storage Manager for Enterprise Resource Planning is a software module that works with IBM Tivoli Storage Manager to better protect infrastructure and application data and improve the availability of SAP R/3 servers.

1.3 New features and changes with Version 5.3

The following features and functions have been added to IBM Tivoli Storage Manager Version 5.3.

1.3.1 ACSLS library support enhancements
Library support has been enhanced to allow the sharing of ACSLS libraries. This implementation will provide the basic support to share ACSLS libraries across IBM Tivoli Storage Manager servers in the same way that SCSI libraries are shared. Support for LAN-free data movement using libraries that are controlled by StorageTek’s ACSLS interface has also been provided.

1.3.2 Activity log management
The activity log can now be managed based either on maximum size for the log or retention time. The new option for size-based activity log management gives administrators greater control over the amount of space the activity log occupies. Additional information about the activity log is now displayed when the server status is queried.

1.3.3 Collocation by group
Collocation by group is now supported. Groups of nodes can be defined, and the server can then collocate data based on these groups. Collocation by group can yield the following benefits:

► Reduce unused tape capacity by allowing more collocated data on individual tapes.
► Minimize mounts of target volumes.
► Minimize database scanning and reduce tape passes for sequential-to-sequential transfer.

For newly defined storage pools, the default storage pool collocation setting is now GROUP.
1.3.4 Communications options

There is now a shared memory communications option between the IBM Tivoli Storage Manager server for Windows and the Backup/Archive client for Windows. It can be used to perform backups, archives, restores, and retrieves. You can also enable the shared memory communication protocol in the Windows storage agent for communication with the Windows Backup/Archive client.

1.3.5 Database reorganization

Periodically reorganizing the Tivoli Storage Manager server’s database can improve performance. A new command has been added allowing administrators to determine the estimated space saved by reorganization of the database. The process can be queried to monitor the command’s progress and, when finished, the results can be viewed by querying the database in detailed format.

1.3.6 Disk-only backup

Disk-only backup has been enhanced in order to take advantage of the inexpensive disk storage currently available in the market. These improvements to sequential-access FILE device type and random-access DISK device class storage include:

- The ability to create large, sequential-access FILE-type storage pools using a single FILE device-class definition that specifies two or more directories.
- The ability to create and format FILE- or DISK device-type volumes in a single step.
- The ability to use enhanced space trigger functionality to automatically allocate space for private volumes in sequential-access FILE device type and random-access DISK device class storage pools. This will reduce the potential for disk fragmentation and maintenance overhead.

1.3.7 Enhancements for server migration

Administrators can now control and schedule routine server operations by scheduling the migration or reclamation command to run during convenient server activity times. The number of processes for migration and reclamation is also enhanced to allow multiple processes for the operations. These new features allow for better utilization of available tape drives and FILE volumes.

1.3.8 IBM 3592 WORM (Write Once Read Many) support

IBM Tivoli Storage Manager now supports the 3592 WORM tape device.
1.3.9 Increased block size for writing to tape

The maximum transfer length for all host bus adapters has increased. The block size used by the IBM Tivoli Storage Manager server on Windows for writing data to certain types of tape drives has also increased. Increasing the transfer length increases the rate at which data is processed for backups, archives, restores, and retrieves. The maximum supported transfer length is now 256 KB.

1.3.10 LAN-free environment configuration

Enhancements have been made to allow you to quickly determine if your LAN-free environment has been configured correctly. You can request validation for one client node and one storage agent. When validation is requested, a detailed report is generated explaining why the storage pool is or is not LAN-free capable. As a result, you can determine if there is a setting or configuration issue on the server preventing LAN-free data movement.

1.3.11 NDMP operations

NDMP operations for backup of NAS file servers have been enhanced to support the following functions:

- Directory-level backup of NAS data, which enables the division of a file system backup operation among several NDMP backup operations as well as several tape drives. This enhancement will reduce backup and restore times.
- NDMP Directory Level Backup will enable IBM Tivoli Storage Manager to backup user created snapshots that are stored as sub-directories, specifically Network Appliance snapshots.

1.3.12 New interface to manage servers: Administration Center

The Administration Center is a Web-based interface that can be used to centrally configure and manage IBM Tivoli Storage Manager Version 5.3 servers. This new interface replaces the administrative Web interface. The Administration Center is installed as an IBM Integrated Solutions Console component. The Integrated Solutions Console allows you to install components provided by multiple IBM applications, and access them from a single interface. See the Installation Guide for installation information.

1.3.13 SCSI library enhancements

You can now define a 3592 drive to an SCSI library.
1.3.14 Simultaneous write inheritance improvements

The simultaneous write function lets you write data simultaneously to primary storage pools and up to three copy storage pools, increasing your level of data protection and reducing the time required for storage pool backup. In Version 5.3, when a data storage operation switches from a primary storage pool to the next primary storage pool in the storage pool hierarchy, the next storage pool inherits the list of copy storage pools and the value of the `COPYCONTINUE` parameter from the primary storage pool. One benefit of this design is that it reduces the likelihood that mount points have to be released and reacquired when the server switches from one primary storage pool to another.

1.3.15 Support for multiple IBM Tivoli Storage Manager client nodes

Backup from multiple nodes to be stored as a single target node in the server database is now allowed. With the consolidation of data under a single target node on the server, directories and files can be easily found when restore operations are necessary. It is also no longer necessary for physical machines to share password files, because password management and IBM Tivoli Storage Manager server authentication is now handled by clients (independent of relationships with other nodes).

1.3.16 IBM Tivoli Storage Manager scheduling flexibility

IBM Tivoli Storage Manager schedule capability now allows for more useful calendar-type administrative and client scheduling. There is now the flexibility to schedule most repetitive items and even some holidays, such as these:

- Run on the last Friday of every month
- Run on the first Sunday of every quarter
- Run on every day in the last week of the year

1.4 Summary

In conclusion, we have discussed the overview, architecture, complementary products, and new functions of IBM Tivoli Storage Manager, and now we are moving on to the planning, sizing, and designing functions.
Planning for installation

This chapter provides planning information about IBM Tivoli Storage Manager installation. The following topics are discussed:

- System requirements
- Design considerations
- Database and pool considerations
- Preparing customers for PoC
2.1 IBM Tivoli Storage Manager’s system requirements

In this section we discuss the necessary hardware and software requirements needed to install and configure IBM Tivoli Storage Manager Extended Edition Version 5.3.

2.1.1 Windows environment requirements

Software requirements:
- Microsoft Windows 2003 Server:
  - Standard, Enterprise, or Datacenter Edition
- 32-bit Microsoft Windows 2003 Server:
  - Enterprise or Datacenter Edition
- 64-bit Microsoft Windows 2000 Server:
  - Advanced Server or Datacenter Server

Web browser requirements:
- You need a Web browser to log in and use the console. The Web browser can be installed on the same or a separate system. The following browsers are supported:
  - Microsoft Internet Explorer 6.x (Windows systems only)
  - Mozilla 1.0.2, Mozilla 1.3 and Mozilla 1.4
  - Netscape 6.2 and Netscape 7

Your browser must support the server codepage. If not, the panels may be unreadable. If your browser meets these requirements but does not correctly display an IBM Tivoli Storage Manager Web-based interface, consider trying a different browser.

Hardware requirements:
- Intel® Pentium® compatible processor or multi-processor based computer
- At least 110 MB of free disk storage (for a typical installation)
- 128 MB (256 MB is recommended) memory
- At least one of the following features (installed by default with the current Windows operating systems):
  - Named Pipes
  - TCP/IP
2.1.2 AIX environment requirements

Software requirements:

- IBM AIX: AIX 5L™ 5.1 or later (32 bit or 64 bit), or AIX 5.2 (32 bit or 64 bit) and AIX 5.3 (32-bit or 64 bit)

Hardware requirements:

- RISC System/6000® or pSeries® computer
- At least 200 MB of free disk storage (for a typical installation)
- 1 GB of memory
- TCP/IP connection

2.2 IBM Integrated Solution Center and Administration Center requirements

The Administration Center is installed as an IBM Integrated Solutions Console (ISC) component. The Integrated Solutions Console allows you to install components provided by multiple IBM applications, and access them from a single interface.

The Tivoli Storage Manager server can require a large amount of memory, network bandwidth, and processor resources. In most cases, the server performs best when other applications are not installed on the same system. If the system meets the combined requirements for the server and the Administration Center (for example, it has at least 2 GB of physical memory), it can support both applications.

You may plan to use the Administration Center to manage an environment with a large number of servers or administrators; then you should consider installing the Administration Center on a separate system.

2.2.1 Software requirements

Here we list the software requirements for the following platforms:

- **Windows:**
- **CPU speeds**: Speeds of late model, mid-range to high-end servers are recommended. Pentium 800 MHz or equivalent at a minimum. Production environments should consider the Pentium 4 processor at 1.4GHz or higher.
- **Physical memory**: 512 MB or more for runtime installations.
- **File system**: NTFS file system is recommended.

**AIX:**
- AIX 5.1 with ML4.
- AIX 5.2 with ML1 + APAR IY44183.
- AIX 5.3.
- RS/6000® at 450MHz at a minimum; production environments should consider higher speeds.
- **Physical memory**: 512 MB or more.

**Linux:**
- CPU speeds of late model, mid-range to high-end servers are recommended. Pentium 800MHz or equivalent at a minimum. Production environments should consider the Pentium 4 processor at 1.4GHz or higher.
- **Physical memory**: 512 MB or more for runtime installations.
- SUSE Linux Enterprise Server (SLES) 8 Powered by United Linux 1.0 on Intel.

**Solaris:**
- Solaris 8.
- Ultra 60 at 450MHz at a minimum; Sun Blade 2000 workstation at 1 GHz or higher is recommended.
- **Physical memory**: 512 MB or more.

### 2.2.2 Hardware requirements

The machine hosting the Administration Center and Integrated Solutions Console requires the following capabilities:

- To install the console on a system for the first time, the user needs 982 MB to satisfy the installation program disk space check. Also needed are an additional 679 MB in the /tmp directory (which is also checked during the installation), as well as 500 MB for the completed installation.
- Equal to double the user’s physical memory is required. At a minimum, this should be at least equal to the physical memory.
Network adapter and connection to a physical network that can carry IP packets; for example, Ethernet, Token Ring, and ATM Static IP address.

Configured fully qualified host name. Integrated Solutions Console must be able to resolve an IP address from its fully qualified host name. To verify that the host name is configured correctly, the user can issue the `ping` command from a command line.

The IBM Tivoli Storage Manager Administration Center Web interface for the server and a Web client interface for client machines require a Java™ Swing-capable (at JRE 1.4.1) Web browser:
- MS Internet Explorer 6.0, or later with Java Plug-in 1.4.1
- Mozilla 1.6, or later

### 2.3 Physical design considerations

In real implementation, it is important to have a proper architectural design to provide a high performance Tivoli Storage Manager solution to customers. In this section, we discuss what components are affecting to the IBM Tivoli Storage Manager’s physical design.

Even though we are going to perform a Proof of Concept (PoC) with a Thinkpad, we need to consider some physical architecture tunings.

In order to plan a better design, we need the following information:

- What type of hardware and operating system will IBM Tivoli Storage Manager run on?
- What will be the network preferences?
- Should data be stored on disk or tape?
- How much data will be backed up every day?
- How much time do we need to complete the backup?

You need to talk with the customer about what is their expectation from this work. You need to agree with your customer, before planning this PoC, and you should involve your customer in every step of your work.

First of all, you should determine if the customer has any platform preferences; if not, choose one that you yourself feel comfortable with. Do not choose a system for which the customer doesn’t have any machines or operating systems.

The next step is designing your storage pools. If you are planning to use any tape device, you should create your storage pools accordingly. If you will only use your disk space and pretend that you have a tape, carefully design your disk storage pools. You will find some more detailed information in the next section.
Now it is time to discuss network connectivity. Tivoli Storage Manager is a network application; data should move from clients to Tivoli Storage Manager server(s). We have several options to do this movement. We may choose to run our PoC on a standalone machine, or attached to any of the following networks: LAN, WAN, or SAN connected machines. In order to understand this better, you should be familiar with the network type and their throughputs. Table 2-1 explains the various type of networks and how fast they are.

Table 2-1  Network throughputs

<table>
<thead>
<tr>
<th>Network Topology</th>
<th>MB/sec</th>
<th>GB/hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Mb/sec Ethernet</td>
<td>1</td>
<td>3.6</td>
</tr>
<tr>
<td>100 Mb/sec Ethernet</td>
<td>10</td>
<td>36</td>
</tr>
<tr>
<td>Gigabit Ethernet</td>
<td>100</td>
<td>360</td>
</tr>
<tr>
<td>16 Mb/sec Token Ring</td>
<td>1.6</td>
<td>5.8</td>
</tr>
<tr>
<td>FDDI</td>
<td>10</td>
<td>36</td>
</tr>
<tr>
<td>ATM 155 Mb/sec</td>
<td>15.5</td>
<td>55.8</td>
</tr>
</tbody>
</table>

Let us explain this with an example; consider a customer who has:
- Two DB2 database servers, each with 5 GB needs fully backed up
- Two Windows 2003 file servers, each with 60 GB and 5% daily change rate
- One hour backup window for all servers
- A limited budget

Using the data in this table, calculate the network speed required as follows:
- 
  \[(5+5) + (2*60*.05)=16 GB\]
- Given that the backup window is 1 hour, then \[16/1 = 16 GB/hr\].

For this environment, Ethernet (100 MB/sec) will be the proper choice.

For our demonstration, we should inform the customers about these network type choices.

### 2.4 Database and pools considerations

The Tivoli Storage Manager database contains information about client nodes, users, policies, schedules, and storage pools. The database also contains pointers to the locations of all backup versions and client files in the Tivoli Storage Manager storage pools. The client data itself is stored in storage pools, not in the database.
Using the Tivoli Storage Manager database, we are able to define storage management policies around business needs for individual clients or groups of clients. Client data attributes such as storage destination, number of versions, and retention period can be assigned at the individual file level and stored in the database.

The Tivoli Storage Manager database also ensures reliable storage management processes. To maintain data integrity, the database uses a recovery log to roll back any changes and updates made if a storage transaction is interrupted before it completes. This is known as a two-phase commit.

As we know, the Tivoli Storage Manager’s database is extremely important for our Tivoli Storage Manager environment and there is no tolerance to lose it. Both the Tivoli Storage Manager database and recovery log can be mirrored for availability, providing automatic volume switching after a media failure.

For our demonstration environment, you should calculate the size of your Tivoli Storage Manager database; the first and the easiest is a rule of thumb. Given an environment consisting of mixed size files, a typical Tivoli Storage Manager Database will be 3-5% of the total amount of data in the environment. Table 2-2 explains that each file consumes database space.

<table>
<thead>
<tr>
<th>Description</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial file/object backup</td>
<td>600 bytes</td>
</tr>
<tr>
<td>Each addition version</td>
<td>200 bytes</td>
</tr>
<tr>
<td>Copy storage pool copy</td>
<td>200 bytes</td>
</tr>
</tbody>
</table>

Tivoli Storage Manager uses a logical construction which is called a Storage Pool to represent storage resources. Different storage pools are used to route client data to different kinds of storage resources. Storage pools can be arranged in a hierarchy, with one pointing to another, to allow for migration of data from one type of storage to another type.

If your demonstration will not have any tape attachments, then you may use the default storage hierarchy. When we are configuring the Tivoli Storage Manager Server, we have chosen the default configuration which is provided by Tivoli Storage Manager.
A default storage pool named DISKPOOL, which represents random-access storage space on the hard drive of the Tivoli Storage Manager server machine. During server initialization, Tivoli Storage Manager created one volume (representing a discrete amount of allocated space) in this storage pool. By default, this volume was configured to grow dynamically. You can add more volumes to expand this storage pool as required.

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

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

This configuration will not be sufficient if you are planning to show some tape and disk pool combinations. If you are planning to do so, then you should do the appropriate storage pool hierarchy design.

2.5 Preparing for Proof of Concept

To demonstrate to a customer how IBM Tivoli Storage Manager can be used in their environments, it is necessary to conduct a number of interviews with various specialists. Our main aim to do this PoC work is to satisfy customers’ needs with the IBM Tivoli Storage Manager product(s). For that reason, we have to set the correct level of expectations with the customer.

Building an IBM Tivoli Storage Manager environment with all the architectural design can require a detailed level of information including, for example, IBM Tivoli Storage Manager Server preferences. What is the network type? Will PoC run in a production network or a private one? What type of data will we back up? What kind of applications does the customer have? The most important issue is to determine what the customer is really expecting from this work.

**Note:** Do not forget that you should shape and direct your PoC, based on your customer's needs and expectations.

For the purposes of a demonstration, it is not strictly necessary to gather the finest detail. However, this may be advisable so that any subsequent PoC project has a head start.
The initial interviews should determine the customer’s objective with IBM Tivoli Storage Manager. During this PoC work, we recommend involving the customer in your demonstration and letting them to do some of the hands on functions by themselves.

It is always better if you can prepare some charts showing the demonstration environment, with some information about the process that you will show. For example, this could be a basic worksheet that shows client names, operating systems, data size on it, backup preferences, etc.

You will find some sample worksheets in A.2, “Sample worksheets” on page 119. You may use them directly or edit them for your own situation.

After completing your work, at the end of each day, it is best to summarize what you have done, and which functions or features of the product have been shown. Then you should document your work and explain each step of your demonstration and get approval from your customer.

Sometimes you need to leave the Tivoli Storage Manager environment on the customer site in order to let the customer get to know the product on their own. In this case, you should leave your contact information and follow up the process with your customer.

Here is a basic checklist that you should follow for the proper planning process.

1. Prepare yourself for the initial customer interview.
2. List all your questions that will shape your final demonstration to your customer.
   a. What will be the server’s platform?
   b. How many clients will be in the PoC scenario?
   c. What will be the OS for these clients?
   d. What type of data will the clients have?
   e. What will be the size of data and number of files?
   f. How many backup versions will be kept?
   g. Explain the network options in terms of speed and backup windows.
3. According to the answers to your questions, design your architecture.
4. Install your Tivoli Storage Manager server.
5. Install server license.
6. Install device drivers.
7. Configure your server:
   a. Update server option file.
   b. Create database and recovery log volumes.
   c. Define tape library and tape drives, if you will perform PoC with tape drives.
   d. Define storage pools and volumes.
   e. Define policy domains, sets, and management classes.
   f. Define copy groups.
   g. Make the policy active.
   h. Define Administrator ID and password.

8. Install clients.

9. Install clients’ schedules.


11. Register clients to server.

12. Relate clients to schedules and option file.

13. Install ISC and Administration Center.

14. Perform your PoC scenarios:
   a. Perform ISC functions.
   b. Show the backup and restore functions from B/A Client GUI.
   c. Schedule backup and let customer see how backup can be done automatically.
   d. Perform operational reports.

15. Document your work and share with your customer.

16. Ask your customer for the next step.

### 2.6 Summary

In this chapter we have discussed the IBM Tivoli Storage Manager system requirements, its physical design, and provided some hints for Proof of Concept. In the next chapter we will go into more detail regarding installation and configuration.
Installation and configuration

Installing IBM Tivoli Storage Manager consists of the following tasks:

1. Installing the IBM Tivoli Storage Manager server and related components on the server machine.

2. Installing the IBM Tivoli Storage Manager client code on every machine that will transfer data to IBM Tivoli Storage Manager server-managed storage.

This chapter describes the installation instructions for installing the IBM Tivoli Storage Manager server and related components for our PoC demonstration scenario.

The instructions given in this chapter are very detailed and explicit. These instructions are not the only way to install IBM Tivoli Storage Manager and its related prerequisites, and are meant to be followed to successfully install and set up an IBM Tivoli Storage Manager environment for both Windows and AIX platforms.
3.1 Installing IBM Tivoli Storage Manager for Windows environment

For successful installation of IBM Tivoli Storage Manager on a Windows system, installable IBM Tivoli Storage Manager components include the following items:

- IBM Tivoli Storage Manager server
- IBM Tivoli Storage Manager licenses
- IBM Tivoli Storage Manager language packs
- IBM Tivoli Storage Manager device driver, or the IBM Tape device driver (for IBM Magstar® and Ultrium devices)

If needed, you can also install the optional IBM Tivoli Storage Manager ODBC driver, which allows reporting applications to export data from the IBM Tivoli Storage Manager database.

**Note:** You cannot install the IBM Tivoli Storage Manager server and the storage agent on the same machine on the Windows platform.

Before starting the installation procedure, ensure that you are logged on to Windows with a user name having administrator authority.

**Note:** IBM Tivoli Storage Manager provides a minimal configuration option, which includes a quick-installation procedure.

Installation of IBM Tivoli Storage Manager will be stopped if an active server or storage agent process is detected, and an error message displayed. All active server or storage agent processes must be halted before installation can proceed.

When you install or upgrade the server to IBM Tivoli Storage Manager V5.3, you must give your servers unique names. If all of your servers have the default name, SERVER1, you will only be able to add one of them to the Administration Center. Use the `SET SERVERNAME` command to specify the new server name. The maximum length of the name is 64 characters.

Example 3-1 shows the command to name a server WELLS_DESIGN_DEPT.

**Example 3-1  set servername command**

```
set servername Wells_design_dept
```

See the *Administrator's Reference Guide* for more details on this command.
3.1.1 Installing IBM Tivoli Storage Manager Server

Let's begin the install process for the basic IBM Tivoli Storage Manager installation. Please follow these instructions:

1. Insert the IBM Tivoli Storage Manager Windows Server CD.

First, the language option windows appear; choose the default language or choose a language from the list as shown in Figure 3-1.

![Language selection menu](image)

*Figure 3-1  Language selection menu*

2. The IBM Tivoli Storage Manager Server CD browser panel appears.

From the Main Menu (see Figure 3-2), click the **Install Products** option.

![Main Menu](image)

*Figure 3-2  Main Menu*
3. The Install Products dialog appears. Choose the **Tivoli Storage Manager Server** option (Figure 3-3).

![IBM Tivoli Storage Manager Server Version 5.3.0.0](image)

**Install Products**

**Recommended Installation Sequence:**

- **TSM Server**
- **TSM Server Licenses**
- **TSM Language Packs**
- **TSM Device Driver**

Additional Installation:

[Return to Main Menu]

*Figure 3-3  Product installation menu*

4. When the welcome panel comes up, click **Next** to continue, then accept the terms in the license agreement and click **Next**.

5. Enter the user name and organization, then select the option, **Anyone who uses this computer**, and click **Next** to continue.
6. The Setup Type dialog appears (Figure 3-4).

![Server setup type dialog](image)

*Figure 3-4  Server setup type dialog*

Select either a **Complete** or **Custom** installation and click **Next**.

**Note:** Custom installation allows you to select console and server features.

– If you select **Complete**: The Ready to Install the Program window appears.
– If you select **Custom**: The Custom Setup Dialog window appears.
7. We shall continue by choosing the custom installation (Figure 3-5).

![Custom Setup](image)

**Figure 3-5  Custom setup features**

You can choose the features from the list, or if you would like to install Tivoli Storage Manager using other than its default installation path, as shown in Figure 3-5.

8. Select **Change** and define installation path and click **Next**.

To begin installation, click **Install** from the Ready to Install the Program window (Figure 3-6).
Installation will start, and you will get the InstallShield Wizard Completed panel.

9. Click **Finish** to complete the installation. The system will ask you to reboot the machine; click **Yes** (Figure 3-7).
3.1.2 Installing Tivoli Storage Manager licenses

To install the Tivoli Storage Manager license package from the CD browser Install Products dialog, do the following steps:

1. Click Tivoli Storage Manager Server Licenses. Click Next on the welcome panel (Figure 3-8).

![IBM Tivoli Storage Manager Server Version 5.3.0.0]

**Install Products**

Recommended Installation Sequence:
- TSM Server
- TSM Server Licenses
- TSM Language Packs
- TSM Device Driver

Additional Installation:

---

*Note:* After the machine is rebooted, you have to plan to install other Tivoli Storage Manager components locally, then return to the CD browser Install Products panel to complete these installations.

2. Enter User Name and Organization information and choose the option, **Anyone who uses this computer** and click Next.

3. Select **Complete** or **Custom** and click Next.
   - If you select **Typical**: The Ready to Install the Program window appears.
   - If you select **Custom**: The Custom Setup Dialog window appears.
Choosing the **Custom** installation will let you change the installation directory. Click **Next** to continue (Figure 3-9).

![Figure 3-9 License File installation](image)

You will receive the InstallShield Wizard Completed panel.

4. Click **Finish** to complete the IBM Tivoli Storage Manager Server license installation.

### 3.1.3 Installing the Tivoli Storage Manager language packs

You can install nine languages other than English. If you have to do your PoC in any other languages than English, you should use the instructions below. Each language pack (one for each language, 9 total) contains language-specific information for the server and the management console.

To install a Tivoli Storage Manager language pack from the CD browser Install Products dialog, do the following steps:

1. Click **Tivoli Storage Manager Language Packs** as shown in Figure 3-10.
2. Click the appropriate language to install.

3. When the welcome panel appears, click Next.

4. You will receive the Ready to Install panel; click Install.

5. After the installation is completed, you will get the InstallShield Wizard Completed panel. Then click Finish to complete the language installation.

### 3.1.4 Installing the Tivoli Storage Manager Device Driver

The Tivoli Storage Manager device driver extends Tivoli Storage Manager media management capability. To install the Tivoli Storage Manager device driver from the CD browser Install Products dialog, do the following steps:

1. Click Tivoli Storage Manager Device Driver.

2. Enter User Name and Organization information and choose the option, **Anyone who uses this computer**; then click Next.

3. Select Complete or Custom installation option and click Next.

   Choosing the Custom installation will let you change the installation directory. Click Next to continue (Figure 3-11).
4. You will receive the InstallShield Wizard Completed panel.

5. Click **Finish** to complete the IBM Tivoli Storage Manager Server Device Driver installation.

The system will ask you to reboot the machine; click **Yes** if you are ready to reboot.

### 3.1.5 Configuration of IBM Tivoli Storage Manager Server

After installing IBM Tivoli Storage Manager, you must configure the Tivoli Storage Manager server. In order to do this, you should follow these instructions:

1. Double-click the Tivoli Storage Manager Management Console icon on the desktop or **Start → All Programs → Tivoli Storage Manager → Management Console**.

If this is the first installation, the Tivoli Storage Manager Console window opens, with the Initial Configuration Task List displayed. Minimal configuration is selected by default, you can see this in Figure 3-12.
In order to have more options for initialization of the server, it is better to choose the standard configuration option.

If you choose to start with Standard Configuration, select the Standard Configuration icon. Additional tasks will be shown on the panel in Figure 3-13.

The following steps are for the Standard Configuration. Server Initialization, which is the only step for Minimal Configuration, is also included in Standard Configuration.
2. Click Start.

3. During Standard Configuration, the following Wizards are run in sequence:
   a. The Initial Configuration Environment Wizard is shown in Figure 3-14.

   Here you must define if you are planning to use standalone (local machine) or network configuration. Usually Proof of Concept work is done in a network environment in order to show backups and restores in network attached computers.

   Figure 3-14  Site environment information panel
b. The Performance Configuration Wizard is shown in Figure 3-15.
You must also define the number of clients that will be attached to the IBM Tivoli Storage Manager server, and the typical size of the files to be backed up.

![Figure 3-15 IBM Tivoli Storage Manager performance options](image)

4. Server Initialization Wizard:
   a. Define the path for Server Instance Directory and click **Next** (Figure 3-16).
b. Server Volume Location

The Wizard will create and initialize Database Volume, Recovery Log Volume, and Disk Storage Pool Volume with default settings, which are 13MB, 9 13MB, and 4 MB respectively, as shown in Figure 3-17.
We believe these settings are good enough for standard Proof of Concept work, but according to your PoC plans, you may change the initial settings by editing the required fields.

5. Click the **Next** button to proceed through the wizard pages (Figure 3-16).

![Server Initialization Wizard](image)

**Figure 3-18 Service logon parameters**

**Note:** You must specify the account that IBM Tivoli Storage Manager service will use to login to Windows, and it is better to choose to start the server when Windows boots.
6. You know that your Tivoli Storage Manager Server is now up and running after you have received the following message (Figure 3-19).

![Server initialization completes](image)

*Figure 3-19  Server initialization completes*

7. When all wizards have been run, select **Done** to finish the installation.

8. After this point, the Initial Configuration Wizard will guide you to do device configuration.

   If you have any attached driver or tape library, you may configure at this time. If you would like to use your disk as a primary storage, then you don’t have to do anything (Figure 3-20).

![Device Configuration Wizard](image)

*Figure 3-20  IBM Tivoli Storage Manager Device Configuration*

9. The next step is defining client nodes and policies (Figure 3-21).
Figure 3-21 Client node and policy configuration

IBM Tivoli Storage Manager storage pools are used to route client data to different kinds of storage resources, such as tape and file volumes. Storage pools can be arranged in a hierarchy to improve the performance of your storage management system.

10. To add a client node, click the Add button.
By default this node will be a part of a policy domain which the name is “Standard”.

Whenever you want, you can run the required wizard to create, add or change any other components to run IBM Tivoli Storage Manager (Figure 3-23).

![Figure 3-23 Server initialization panel](image)

### 3.1.6 Configure License Options

Licensing in V5.3 has changed from previous versions. After installing the Version 5.3.0 server, you must register new licenses. The **REGISTER LICENSE** command has changed with this version, and its function is currently limited:

- You can register licenses for server components. This includes Tivoli Storage Manager (base), Tivoli Storage Manager Extended Edition, and Tivoli Data Retention Protection.

- You cannot register licenses for components that are licensed on the basis of processors (for example, Tivoli Storage Manager for Mail, Tivoli Storage Manager for Databases, Tivoli Storage Manager for ERP, Tivoli Storage Manager for Hardware, and Tivoli Storage Manager for Space Management).
Your license agreement determines what you are licensed to use, even if you cannot use the REGISTER LICENSE command to register all components. You are expected to comply with the license agreement and use only what you have purchased. Use of the REGISTER LICENSE command implies that you agree to and accept the license terms specified in your license agreement.

REGISTER LICENSE FILE=<license_file>

tsmbasic.lic — To license base IBM Tivoli Storage Manager.

tsmee.lic — To license base IBM Tivoli Storage Manager Extended Edition. This includes the Disaster Recovery Manager, large libraries, and NDMP.

dataret.lic — To license IBM Tivoli Storage Manager for Data Retention. This is required to enable Data Retention Protection as well as Expiration and Deletion Suspension (Deletion Hold).

To check the license, you can use the query license command (Figure 3-24).

```
Last License Audit: 03/07/2005 12:00:28
Is Tivoli Storage Manager for Data Retention in use?: No
Is Tivoli Storage Manager for Data Retention licensed?: No
  Is Tivoli Storage Manager Basic Edition in use: Yes
  Is Tivoli Storage Manager Basic Edition licensed: Yes
Is Tivoli Storage Manager Extended Edition in use: No
Is Tivoli Storage Manager Extended Edition licensed: Yes
Server License Compliance: Valid
```

Figure 3-24 Output of query license command

3.1.7 Installation of IBM Tivoli Storage Manager Client

The Tivoli Storage Manager Backup/Archive client helps you protect information on your workstation. Using Tivoli Storage Manager, you can maintain backup versions of your workstation files that you can restore if the original files are damaged or lost. You can also archive workstation or server files that you do not currently need, preserve them in their current state, and retrieve them when necessary.

You can access Tivoli Storage Manager backup and archive features:

- Locally through the client command line interface
- Remotely or locally through the Web client interface
Follow these steps to install the software on your Windows 2000, Windows XP, or Windows Server 2003 workstations:

1. Insert the CD-ROM that contains the Tivoli Storage Manager Windows client into your CD-ROM drive. If you have autorun enabled, the installation dialog should start when the CD loads. If the installation dialog does not start automatically, you can start it manually. Select **Run** from the Start menu and at the prompt, type: `x:\setup` (where `x` is your CD-ROM drive). Click **OK**.

2. Follow the instructions displayed on the panel.

3. First of all, you should choose your language for your menu selections, then you will receive the installation main menu (Figure 3-25).

![IBM Tivoli Storage Manager Client installation main menu](image)

*Figure 3-25  IBM Tivoli Storage Manager Client installation main menu*

Choose **Install Products** to continue.
4. Choose the proper client from the menu; clients are shown in Figure 3-26.

![IBM Tivoli Storage Manager Client Version 5.3.0.0](image)

**Install Products**

- TSM Backup-archive Client - 32
- TSM Backup-archive Client - 64
- TSM Language Packs - 32
- TSM Language Packs - 64
- Additional installation:
  - TSM ODBC Client

*Return to Main Menu*

*Figure 3-26 Choosing client type*

5. You will be prompted for the language selection for your client. Then click **Next** on the welcome panel.

6. Choose the destination folder for Tivoli Storage Manager Client code and click **Next** to continue.
7. You will reach the Setup Type option menu (Figure 3-27).

![Figure 3-27 Client setup options](image)

In regard to the two setup types shown on this menu:

- Choosing **Typical** installs the minimum necessary to provide normal backup and archive functions. If you are upgrading from a Version 4.1 or 4.2 client, this updates the components that are currently installed. Otherwise, this includes the Backup/Archive client, the API Runtime files, and the Web Client.

  At this point, choose **Custom** and click **Next**.

- Choosing **Custom** takes you to the Custom Setup window. From this window, you can click any program feature icon to modify that feature if it is not mandatory for installation.

You can select from the following program features:

- Backup/Archive client:
  - Backup/Archive client GUI Files (mandatory; cannot be deselected)
  - Backup/Archive client Web Files (mandatory; cannot be deselected)
  - Client API Runtime Files (mandatory; cannot be deselected)
  - Client API SDK Files (optional)
  - Administrative Client Command Line Files (optional; not enabled by default)
  - Image Backup (optional; not enabled by default)
  - Open File Support (optional; not enabled by default)
8. The installer displays the exact amount of disk space that is required for each program feature. Ensure that there is enough disk space on the destination drive for the files you choose to install. The installation program will not install to a destination drive with insufficient disk space.

9. Click **Next** to start the installation (Figure 3-28).

![Client custom setup options](image)

**Figure 3-28**  Client custom setup options

You will receive the InstallShield Wizard Completed message; then click **Finish** to complete the installation.

### 3.1.8 Configuring Tivoli Storage Manager Client

Now it is time to configure your client. You can start your configuration wizard form your desktop, choosing **Start** → **All Programs** → **Tivoli Storage Manager** → **Backup-Achieve GUI**.

Configuration can be done either from Tivoli Storage Manager Backup/Archive GUI or by editing the dsm.opt file directly.

From the Client Configuration Wizard, you can also configure WebClient, Client Scheduler, Journal Engine, and Online/Open file support features.
Click the first option and click **Next** to start the configuration (Figure 3-29).

![TSM Client Configuration Wizards](image)

**Figure 3-29  IBM Tivoli Storage Manager Client configuration wizard**

Here are the steps to follow:

1. If you do not have a dsm.opt file, a setup wizard is launched automatically when you start the GUI. The setup wizard can help you configure an initial options file.
2. Choose **Create a new options file** and click **Next** to continue.
3. Key in the Tivoli Storage Manager node name and click **Next**.
4. With Tivoli Storage Manager V5.3, it is possible for the client to connect to Tivoli Storage Manager server via four communication methods:
   - TCP/IP (same as previous releases.)
   - Named Pipes (same as previous releases)
   - Shared Memory (new for V5.3)
   - Use Active Directory to locate Tivoli Storage Manager server (new for V5.3)

   Click **TCP/IP** and click **Next** to continue.
5. Enter the Tivoli Storage Manager server's IP address or DNS name and leave the port as 1500. Click **Next** (Figure 3-30).

![Figure 3-30 Default include/exclude list](image.png)

6. With this release, the configuration wizard automatically adds recommended INCLUDE/EXCLUDE list statements.

7. Leave the list at the default values, or if you would like not to add any one of the lines, just click it, then select **Next** to continue.

8. The next panel is for the common file exclude selection menu. You can select the file extension to be excluded during the backup process. Click **Next**.
9. You need to choose your backup options from the Domain for Backup panel shown in Figure 3-31.

![Figure 3-31 Backup options](image)

10. Click Next, and you will receive the installation completion panel. Click Finish to complete the configuration.

You will receive a login window to login to the Client GUI. Enter the password which you entered while you were registering this node to Tivoli Storage Manager server.

### 3.1.9 Configuring Tivoli Storage Manager scheduler

In order to start the scheduler, you must configure the Tivoli Storage Manager Client Scheduler using the Setup Wizard.

1. Choose from the Utilities and Setup Wizard.
2. Click **Tivoli Storage Manager Client Scheduler** and click **Next** (Figure 3-32).

![TSM Client Configuration Wizards](image)

**Figure 3-32 Setting the schedule option**

3. Use the default options and enter the password as **client**.

4. Choose **Automatically Start** option for the server option.

5. Click **Finish** to close the dialog box.

You can use and demonstrate how the automatic backup schedule function works.

Now you are ready to show some IBM Tivoli Storage Manager functions using this client. Figure 3-33 shows the main panel for the Client GUI.
Chapter 3. Installation and configuration

3.2 Installing IBM Tivoli Storage Manager for UNIX (AIX) environment

In this section we discuss the important steps for installation and configuration for AIX operating systems. We recommend that you read the IBM Tivoli Storage Manager Quick Start publications for the requirements for other UNIX® flavors in the following link:


Next we explain the important steps of the IBM Tivoli Storage Manager server installation for AIX (see Figure 3-34). We will use the System Management Interface Tool (SMIT) procedure to install the server and device support.
Follow these installation procedures:

1. Log in as the root user.

2. Load the CD into the selected drive.
   a. If you downloaded the code from PartnerWorld® or PasswordAdvantage site, then you should unzip the code by entering the following commands:

   ```
   Gunzip code.tar.gz
   tar -xvf code.tar
   ```
   b. Change directory to `../usr/sys/inst.images/`.
   c. You may need to create TOC by entering the `INUTOC` command.

3. Select `smitty → Software Installation and Maintenance → Install and Update Software → Install and Update from ALL Available Software`.
   a. Edit the install path for the Input Device/ Directory for software field.

4. Locate the line **Software to Install**. Press PF4.

5. Select the one of the file sets you want to install for your configuration, then click **OK**:
   a. 32-bit hardware, 32-bit AIX kernel
   b. 64-bit hardware, 64-bit AIX kernel
   c. 64-bit hardware, 32-bit AIX kernel

---

![IBM Tivoli Storage Manager AIX server installation](image)

Figure 3-34 IBM Tivoli Storage Manager AIX server installation
6. Click **OK**.

7. Check the default settings for the options on this window. To continue, click **OK** (Figure 3-35).

![Command Status Window](image)

_Figure 3-35  Default settings panel_

8. You will receive the question **ARE YOU SURE?...** from SMIT.

9. To continue, click **OK**. This installation can take several minutes to complete (Figure 3-36).

**Note:** Some file sets are operating system-level-specific and will fail to install. This is normal behavior, and should not be interpreted as an error.
10. After the installation is complete, click **Done**, remove the CD, and exit from SMIT.

**Note:** The Database, Recovery Log, and default storage pools are created (or should be) by the installation process.

11. To start the server from the `/usr/tivoli/tsx/server/bin` directory, enter:

   ```
   nohup ./dsmser
   ```

   Or, run in the background with:

   ```
   nohup ./dsmser &
   ```

For detailed installation and configuration information, you should refer to the *IBM Tivoli Storage Manager Server for AIX Installation Guide Version 5.3*, GC32-1597-00.

### 3.2.1 Installing IBM Tivoli Storage Manager Client for AIX

To install Tivoli Storage Manager from the CD-ROM:

1. Log in as the root user. Insert the CD-ROM into the CD-ROM drive device. You will need to manually mount the CD-ROM device for remote or NFS installations.
2. From the AIX command line, type `smitty install` and press Enter.

3. Select **Install and Update Software** and press Enter.

4. Select **Install and Update From ALL Available Software** and press Enter.

5. At the INPUT device/directory for software prompt, press the F4 key and select the CD-ROM device containing the installation CD-ROM, or specify the directory containing the installation images, and press Enter.

6. At the SOFTWARE to install prompt, press the F4 key. Select the Tivoli Storage Manager filesets you want to install and press Enter (Figure 3-37).

![Figure 3-37 IBM Tivoli Storage Manager Client install options]

7. Select the options you want and press Enter to begin the installation.

8. After installation completes, you should see a completion panel (Figure 3-38).
9. We have now completed the Client code installation. For detailed installation information, please refer to the Linux Backup/Archive Clients Installation and User’s Guide for AIX Version 5.3, GC32-0789-05.

3.2.2 IBM Tivoli Storage Manager Client Configuration

After installing the IBM Tivoli Storage Manager AIX client code, you must complete the client configuration. The client configuration files, which are `dsm.sys` and `dsm.opt`, can be found at the installation directory:

```
/us/tivoli/tsm/client/ba/bin
```

To configure the client, you should do the following steps:

1. Copy `dsm.sys.smp` to `dsm.sys` and `dsm.opt.smp` to `dsm.opt`.
2. Edit the `dsm.opt` as follows:
   a. Remove the comment in front of SERVERNAME.
   b. Add servername stanza. (The value can be anything you want. It should match the value that you will insert in dsm.sys.)
3. Edit dsm.sys:
   a. Change Server_a to the one in step 2.b
b. Change **TCPSERVERADDRESS** to the real IP address of Tivoli Storage Manager server.

   c. You can add other client options.

In addition to this configuration, you may configure the following steps:

- Communication options
- Backup and archive processing options
- Restore and retrieve processing options
- Scheduling options
- Authorization options
- Error processing options
- Transaction processing option
- Web client options

For detailed configuration information, please refer to the *Linux Backup/Archive Clients Installation and User's Guide for AIX Version 5.3*, GC32-0789-05.

### 3.3 Installing ISC and configuring Administration Center

This section provides instructions for installing the ISC and Administration Center on Windows machines. Starting with the IBM Tivoli Storage Manager version 5.3, you can only access IBM Tivoli Storage Manager via the Administration Client or Administration Center.

Version 5.0.2 of the Integrated Solutions Console is required to use the Administration Center. This version of the Integrated Solutions Console is to be installed prior to installing the Administration Center. From the Administration Center on any platform, all Tivoli Storage Manager Servers on any platform can be accessed.

**Note:** The Integrated Solutions Console and the Administration Center can only manage Tivoli Storage Manager server 5.3 and up.

Access to Tivoli Storage Manager server V5.3 from a browser is no longer supported. If you try this, you will receive the message shown in Figure 3-39.

![Figure 3-39](image-url)
Installing and configuring ISC-Admin center consists of the following tasks:

- Installing the ISC
- Installing Administration Center
- Adding Tivoli Storage Manager server to Admin Center
- Operating and configuring Tivoli Storage Manager server from Admin Center

**Installation the IBM Integrated Solution Center (ISC)**

Follow these steps (Figure 3-40):

1. Insert the ISC CD, or download code from Internet.
2. Run `setupISC.exe`.
3. Click **Next**. Accept the License and click **Next**.
4. Specify the Installation Directory (CD or the directory where you run `SETUPISC.exe`).
5. Specify the directory where you want to install ISC (Default `C:\Program Files\IBM\ISC`).
6. Specify Console User ID and password (default iscadmin) (Figure 3-41).

![Figure 3-41  User ID and password creation](image)

7. Specify HTTP and HTTPS ports (Default 8421, 8422).
8. The installation process can take approximately 1 to 2 hours. You can follow the installation by continuously checking the properties of the installation directory (Figure 3-42).

![ISC properties](image)

*Figure 3-42  ISC properties*

9. You will see the installation process panel as shown in Figure 3-43.
10. You will get the following message and URL for ISC, when the installation completes, as shown in Figure 3-44.
11. To verify the installation (Figure 3-45), open the browser and reach:

http://localhost:8421/ibm/console

![Integrated Solutions Console](image)

*Figure 3-45  Starting the ISC console*

12. To run the ISC, enter the user ID and password that you defined in the installation step 6.

With this step we have successfully installed the ISC, and now we are going to install the Administration Center.
Installation of Administration Center

Follow these steps (Figure 3-46):

1. Insert the Administration center CD, or download code from Internet.
   a. Downloaded code is in tar format. Extract it to a temporary directory.
2. Run setupAC.exe.
3. Click **Next**. Accept the license and click **Next**.

   ![Administration Center welcome panel](image)

   *Figure 3-46  Administration Center welcome panel*

4. The installation will ask whether ISC has been installed on the default paths. If the information is not correct, then select **I would like to update the information** and click **Next**.
5. Specify the directory where you installed ISC (Default C:\Program Files\IBM\ISC).
6. Specify Web administration port (default 8421).
7. Specify Console User ID (default iscadmin) and password.
8. Specify installation path where you run setupAc.exe.
9. Installation may take 30 minutes.
10. You will get the following message and the URL for ISC (Figure 3-47).

![IBM Tivoli Storage Manager Administration Center](image)

**Figure 3-47 AC installation completes**

11. Click **Next**, and you will be transferred to the ISC login page.

To get started, log in using the Integrated Solutions Console user ID and password you specified during the installation. When you successfully log in, the Integrated Solutions Console welcome page is displayed as shown in Figure 3-48.
12. Expand the Tivoli Storage Manager folder in the Work Items list and click Getting Started to display the Tivoli Storage Manager welcome page. This page provides instructions for using the Administration Center.

We have completed the installation of IBM Integrated Solution Center and Administrator Center. If you need more detail on this installation, you should read Chapter 23, “Administration Center”, in the IBM Redbook, *IBM Tivoli Storage Manager Version 5.3 Technical Guide*, SG24-6638-00.

You may also refer to Chapter 4, “Installing the Administration Center”, in *IBM Tivoli Storage Manager Installation Guide for Windows Version 5.3*, GC32-1602-00.

### 3.3.1 Configuring the Administration Center

After installing ISC and Administration Center, Tivoli Storage Manager servers should be added to the portal. Only Tivoli Storage Manager 5.3 and later releases can be added.

In the following sections we explain the configuration steps for the Administration Center.
Adding server to Administration Center

Follow these steps (Figure 3-49).

2. Enter Console user ID and password and click login.
3. Click Tivoli Storage Manager.
4. Click Storage Devices.
5. From the Servers window, select Action → Add Server Connection → Go.
6. Enter the necessary information, such as Admin Name, password, server address and server port:
   a. If this is the first installation, Admin name and password is ADMIN.
   b. In order help the monitor to check your Tivoli Storage Manager server, during installation, the ADMIN_CENTER admin name has been created. You have to unlock the Admin.
7. The health monitor default password is ADMIN_CENTER. Change the ADMIN_CENTER password. You can also change the refresh time for the health monitor. The default is 10 minutes.

Figure 3-49 Adding TSM server to Admin Center

8. Your Tivoli Storage Manager server is now ready for the configuration.
Checking the Health of Tivoli Storage Manager server

Follow these steps (Figure 3-50):

1. Click **Health Monitor**.

2. Just under the Health column, you may see the following messages:

   a. Normal (green): The server is running and the health monitor identified no problems.

   b. Unknown (blue): The server could not be contacted. Possible causes include these:
      - The server is not currently running.
      - Network problems prevent communications with the server.
      - The administrator name that the health monitor uses, ADMIN_CENTER, is locked or does not exist on the server.
      - There were internal errors in the health monitor.

   Click the server name to get more information about possible causes.

   c. Warning or Needs Attention (yellow): The health monitor detected conditions that might develop into significant problems. You need to take preventive actions for the server's database, storage devices, or both. Click the server name for details.

Figure 3-50   Health monitor panel
d. Critical or Error (red): The health monitor detected significant problems in the server's database, storage devices, or both. The problems prevent the server from operating normally, as shown in Figure 3-51.

The database or recovery log is out of space, or a library is not functioning. Click the server name for details.

![Detailed health information](image)

**Figure 3-51** Detailed health information

3. Click the server name to get more information.

4. This window will give you the overall status of your Tivoli Storage Manager server (Figure 3-52). Identify the problem area and select the appropriate Detailed Report:

   a. In this page, in the Database Information column, there is a “Need Attention” flag. Choose Database and Recovery Log Information.

   b. Detailed Health report for Database and Recovery log, takes our attention to following points.

      i. Cache Hit Ratio is less than its ideal value. Change the bufferpoolsize and wait for the next refresh. When the Health Monitor refreshes its information, you will see that the status of Tivoli Storage Manager server is now good.
Adding database/recovery volumes
These are the steps to follow (Figure 3-52):

1. Select Storage Devices.
2. Click the server name to get the Server Properties windows.
3. Select Database and Log.
4. Select the Add Volume task from Select Action on top of the Database Section and click Go.
5. Fill in the Database Volume name, capacity, and click OK.
6. With this release, it is possible to extend the database while creating it.

**Note:** To create the volume using other than the system default path, fill in the Volume Name field with the fully qualified directory path name.

### 3.4 Summary

In summary, this chapter provided detailed steps for the basic installation and configuration of the IBM Tivoli Storage Manager and its components.
Demonstration scenarios

This chapter provides some IBM Tivoli Storage Manager demonstration scenarios you may use in your Proof of Concept work. These scenarios have been tested, and we believe that they cover most of the IBM Tivoli Storage Manager functions that will satisfy the customer’s ideas about the product. You may add some more scenarios to your Proof of Concept work.

We describe the following topics:

- Client demonstration scenarios
- Server demonstration scenarios
- ISC and Administration Center scenarios
4.1 Client demonstration scenarios

In this chapter, we work on the PoC scenarios. We cover the basic backup and restore, the archive and retrieve functions, and some ISC functions as well.

4.1.1 Client configuration for backup and archive functions

Operating system object backup can be taken by using the Backup/Archive Client GUI interface. In order to take backup of any client, it should first be registered to Tivoli Storage Manager server. After that, you can follow this procedure:

1. Open the GUI by entering the DSM command or selecting Start → All Programs → Tivoli Storage Manager → Backup-Archive GUI.

2. If this is the first time you are logging in, the Tivoli Storage Manager Client Configuration Wizard is started (Figure 4-1). Otherwise, you should skip to step 3.

   ![Figure 4-1 IBM Tivoli Storage Manager client configuration wizard](image)

   c. Click Next, and be sure this option is selected: Help me configure the Tivoli Storage Manager Backup Archive Client.

   d. Select Create a new option file and click Next.
e. Enter the node name which you have defined in Tivoli Storage Manager server. The default name is your machine name.

f. Select the communication method that you intend to use (TCP/IP, Named Pipes, Shared Memory, Use Active Directory to locate the Tivoli Storage Manager Server).
   - If the client and Tivoli Storage Manager server are on the same machine, select **Shared Memory** or **Named Pipes**. Otherwise, select **TCP/IP**.

g. Assume that TCP/IP has been selected in the previous step. In the next panel, you are asked to enter the TCP/IP address of Tivoli Storage Manager server (Figure 4-2).

![Figure 4-2  TCP/IP parameters for clients](image)

h. For the time being, do not change any INCLUDE/EXCLUDE, Common File Exclusion Selection, Domain for Backup settings, and just click **Next** until you reach the last panel.

i. Click **Finish**.

j. You are asked to enter the password, after which you will end up with the configuration (Figure 4-3).
4.1.2 Incremental (complete) backup

Follow these steps:

1. Open the Backup-archive GUI from Start → Programs → Tivoli Storage Manager → Backup/Archive GUI. Login with a valid password.

2. Select Backup from the initialization panel.

3. Use the drop-down menu to select Incremental (Complete) as the type of backup.

4. Expand the directory until you find the critical directory.

5. Click the square box to the far left of the critical directory (Figure 4-4).
6. Click **Backup**.

7. IBM Tivoli Storage Manager will start to backup the files in the directory, and the following panel will show the data transfer rate and network utilization values, as seen in Figure 4-5.

8. You can check your backup process by clicking the report icon or the Tivoli Storage Manager server, by entering the `Q SESS` command.
9. When the backup finishes, the concluding panel will pop up.

### 4.1.3 Selective backup

In this exercise, you will perform a selective backup of the files in the critical directory that starts with the letter A using the find function.

1. In the backup window, select *Always backup* as the type of backup.
2. Expand the directory tree until you find the critical directory.
3. Click the box to the far left of the critical directory to select all files.
4. Click the folder icon to the right of the plus sign next to Critical to display the files illustrated in Figure 4-6.
Chapter 4. Demonstration scenarios

Figure 4-6  Selective backup panel

5. Select **Edit → Find**.

6. The Find Files (Backup) dialog box displays. Click the Name: shown in a drop-down list.

7. Select **Starts With**.

8. Tab to the next text box and type: A (Figure 4-7).

Figure 4-7  Find a file window
9. Click the **Filter** button. You should get the following message:

Items currently selected will not be processed if they do not match the filter specification. Continue anyway?

10. Click the **Yes** button to close the Tivoli Storage Manager Dialog box.

11. The file view in Figure 4-8 shows that the right side should contain a list of files in the critical directory that begin with the letter A.

![Figure 4-8 Result after selected the files](image)

12. Run an estimate on the file you selected above for the backup process. Record the time here. Click the **Estimate** button.

13. Click **OK** to close the Estimated Time for Backup window seen in Figure 4-9.

![Figure 4-9 Estimates backup time](image)
14. Back up these files now and compare the actual time to the estimated time.
15. Click the **Backup** button.
16. View the Backup Report, then close the Backup Report window (Figure 4-10).

![Backup report panel](image)

**Figure 4-10 Backup report panel**

### 4.1.4 Creating an inactive copy

Follow these steps:

1. Edit one of the files that you have just backed up and perform another backup.
2. Now you have created an inactive backup copy of this file.
3. You will demonstrate how to restore the active and the inactive copies of any files that you have backed up.
4.1.5 Manual backup using Backup-Archive Command Line

Follow these steps:

1. Open the command line interface either by entering the DSMC command or selecting Start → All Programs → Tivoli Storage Manager → Backup-Archive Command Line.

2. You can get the command syntax by entering help.

3. You can run incremental, selective backups.

4. To do selective backups, run the following command:

   `Selective c:\$user\backup.txt`

5. To do incremental backups, run the following command examples.
   a. `Incremental` (backs up all files not excluded by you).
   b. `Incremental C:` (backs up all files in directory C that are not excluded).
   c. `Incremental C: D: E:` (backs up files in C:, D: and E:).
   d. `Incremental C:\$user` (backs up files in C:\$user directory).
   e. `Incremental -sub=yes C:\$user` (backs up all files under all subdirectories).

Figure 4-11 shows the results of the command line backup process.

![Figure 4-11 Manual backup results](image)
4.1.6 Restore using GUI

This section describes several methods of restoring using the GUI.

**Restoring to the original location**

Follow these steps:

1. To start restore files that have been backed up, click the Restore button from the GUI panel.
2. Click the file level and see all the directories you have already backed up to your system.
3. Expand the box of the critical directory to view the files.
4. In the File View of the Restore Window (the right side of the panel), click the check box to the left of the Tivoli Storage Manager Demoguide.com file to select it (Figure 4-12).

![Figure 4-12 Restore files](image)

5. Click the Restore button.
6. Select Original location. By selecting this, you will restore the file to where it has backed up. Figure 4-13 shows the restore options.
7. Click the **Restore** button.

8. If the file exists in the restore location, you will receive the following message as shown in Figure 4-14.

![Figure 4-13 Selecting the destination for restore](image)

9. Click the **Replace** button.

10. Click **OK** to close the Restore Completed message.

**Restoring to another location**

Follow these steps:

1. To start to restore files that have been backed up, click the **Restore** button from the GUI panel.
2. Click **File Level** and see all the directories you have already backed up to your system.
3. Expand the directory tree until you find the critical directory.
4. Click the box of the critical directory to view the files.
5. In Figure 4-15, showing a File View of the Restore Window (the right side of the panel), click the check box to the left of the Tivoli Storage Manager Demoguide.com file to select it.

![Figure 4-15   Selecting files for restore](image)
6. Click the **Restore** button.

7. Assume that we will restore to a different location.

8. Select **Following Location** and select the directory to which you want to restore, as seen in Figure 4-16.

9. There are four possible ways to restore the destination directory.
   a. **Restore Complete Path:** Restores the entire path (starting from the root) of single backup versions or fully-selected directories and puts them in the specified directory.
      
      *Example:* If you backed up `c:\$user\tsm\backup.txt` and you have selected `D:\Destination`, then after restore, the file will be in `D:\Destination\$user\tsm\backup.txt`.

   b. **Restore Partial Path:** Restores single backup versions and puts them in the specified directory, and fully-selected directories to the specified directory.
      
      *Example:* If you backed up `c:\$user\tsm\backup.txt` and you have selected `D:\Destination`, then after restore, the file will be in `D:\Destination\backup.txt`.

   c. **Restore Partial Path without base directory:** Restores a fully-selected directory and puts it in the specified directory without the base directory. The base directory is the directory next to the selection box that you checked in the Restore window. If you selected individual files in addition to fully-selected directories, the restore behavior is the same as that described for the Restore Partial Path radio button.
      
      *Example:* If you backed up `c:\$user\tsm\backup.txt` and you have selected `D:\Destination`, then after restore, the file will be in `D:\Destination\backup.txt`.

   d. **Do not Preserve Directory Structure:** Restores any backup version and puts it in the specified directory and does not preserve the directory structure for the backup version.
10. Click the **Restore** button.
11. Click **OK** to close the Tivoli Storage Manager dialog.
12. Close the **Restore Report** dialog box.
13. Check the new directory and find the file has restored.

**Restoring inactive versions**

Follow these steps:

1. Select the **Restore** button on the backup archive GUI.
2. By default, only active backed up files are displayed. You will need to indicate that you want both active and inactive files by selecting **View → Display Active/Inactive files**.
3. You will be prompted with a message saying the current selections will be lost (Figure 4-17). Click **Yes**.
4. Expand the directory tree until you find the critical directory.
5. Click the + sign of the critical directory.
6. Click the check box to the left of the critical folder icon.
7. Select the files with the green diamond next to them (Figure 4-18).

![Figure 4-18  Restoring the inactive version]

8. Click the Restore button for the original location.
9. Click the Restore button, again.
10. Select the box Apply action to all Remaining files.
11. Click Replace, if you will replace with the existing file; otherwise choose the option, Following Location.

**Restoring using point in time option**
1. Select the Restore button on the backup archive GUI.
2. Click the Point in Time button and set the date and time you wish to restore files as of that date and time (Figure 4-19).
3. In Figure 4-20 you will see the settings next to the Point in Time button and you will only choose from the snapshot of the system on that day and time.

4. Click the Restore button.
4.1.7 Restore using Backup-Archive Command Line

Follow these steps:

1. Open command line interface either by entering DSMC command or selecting
   Start → All Programs → Tivoli Storage Manager → Backup-Archive
   Command Line.

2. You can get command syntax by entering help.

3. As in the GUI version, you can select destination:
   a. To restore to the original location, restore c:\$user\tsm\backup.txt
   b. To restore to a different location, restore c:\$user\tsm\backup.txt
d:\Destination\backup.txt
   c. To restore and rename the file, restore c:\$user\tsm\backup.txt
d:\destination\restore.txt

4. To restore an inactive version, you can either specify the date and time or you
   can pick from the list.

   To pick the correct version of the file, issue following command:
   
   Restore c:\$user\tsm\backup.txt -pi -ina
   
   - pi means, the pick function will be used.
   - ina means, the inactive version.

   See Figure 4-21 for an example of this.

![Figure 4-21 Manual restore file selection](image)
5. Select the object by entering its line number.
6. Select **O** to start restoring.

You can show the archive and retrieve function; it will be the same as backup and restore. There will be only one difference: You do not have to specify version numbers, but you have to specify how long you want to keep the data.

### 4.1.8 Archive using GUI

This section describes some archive methods using the GUI.

**Archive files**

Follow these steps:

1. Start the backup-archive GUI.
2. Reply **Yes** if asked about a one-time conversion of archived files.
3. Select a few files in the critical directory to be archived (Figure 4-22).

![Figure 4-22 Archiving files](image)

4. Click **Archive** and click **OK** for the dialog box.
Adding more files to an existing archive
Follow these steps:

1. Add these archived files to an existing archive package by clicking the select box to the right of the description field.
2. Pick an archive file from the list of archive files displayed (Figure 4-23).

![Figure 4-23  Adding more files to existing archive](image)

3. Reply Yes if asked about a one-time conversion of archived files.
4. Click Archive and click OK for the dialog box.

Retrieve using GUI
Follow these steps:

1. Start the backup-archive GUI and select Retrieve files (Figure 4-24).
2. Select the archive to retrieve.
3. Click the + sign to the left of the Server1 node icon for listing the archive packages.
4. Click the + sign to the left of an archive package to list the files that make up the package. You may need to continue expanding the directory tree to get the entire package expanded.

5. Clicking the folder icon next to a directory name will display any archived files that are in that directory in the File View portion of the panel (the right side of the window).

6. Select some of the files or the entire package to retrieve.

7. Retrieve the files.

8. Click **Retrieve for Original Location**.

9. Click **Retrieve**, if you will replace with the existing file; otherwise, choose the **Following Location** option.

10. Select the box labeled **Apply action to all remaining files**.

11. Click **Replace**

12. When the retrieval is complete, click **OK**.
4.1.9 Backup using schedule backup feature

Schedule for Tivoli Storage Manager V5.3 is more flexible than ever before. Let us create a schedule such that backup will occur every first Sunday of each month.

Setting a schedule
Follow these steps:
1. First select **Policy Domain and Client Nodes**.
2. Click the domain (Figure 4-25).

3. Select **Client Node Schedules** to expand the schedules.
4. Create a schedule by selecting **Select Action → Create a Schedule** and **Go**.
5. The Create Schedule wizard will start.
6. Fill in the schedule name, description, and schedule type, such as backup, and then click **Next** (Figure 4-26).
7. Select **Incremental Backup** for the sake of example.

8. The Select Repetition Options panel is displayed. And you can select several different schedules from the list. We will select **Repeat on one or more days of week** (Figure 4-27).

![Figure 4-26 Creating schedule](image1)

![Figure 4-27 Select repetition options](image2)
9. Select only Sunday and also click **Select weeks in which the schedule runs** (Figure 4-28).

![Create Schedule](image)

*Figure 4-28  Repeating the schedule - day of week*

10. **Refine the Schedule Repetition-Weeks** is displayed. Now select **The First week of the month** and click **Next**.

11. Define schedule priority, schedule expiration, and start duration and click **Next**.

12. Now select the client nodes for this schedule and click **Next**.

13. A summary panel will be displayed. Select **Finish** to end the Create Schedule task (Figure 4-29).
Figure 4-29  Summary panel

Schedule scenario
Let us create a schedule such that backup will occur only on 1st, 7th, 21st, and 26th of January, April, and August of the year:

1. First select Policy Domain and Client Nodes.
2. Click the domain.
3. Select Client Node Schedules to expand the schedules.
4. Create a schedule by selecting Select Action → Create a Schedule and Go.
5. The Create Schedule wizard will start.
6. Fill in the schedule name, description and schedule type such as backup and then click Next.
7. Select Incremental Backup for the sake of example.
8. The Select Repetition Options panel is displayed, where you can select several different schedules from the list. We will select Repeat on one or more days of month.
9. On the Repeat the schedule - Day of the month panel, select the 1st day and while pressing the Control Key, select 7th, 21st, and 26th day and click the option, Select months in which the schedule runs (Figure 4-30).
10. Click only January, April, and August, and then click Next (Figure 4-31).

11. Define schedule priority, schedule expiration, and start duration and click Next.

12. Now select the client nodes for this schedule and click Next (Figure 4-32).
Figure 4-32  Schedule summary panel

13. A summary panel will be displayed. Select Finish to end the Create Schedule task.

4.2 Server scenarios

In this section we show scenarios done by the Tivoli Storage Manager Server.

4.2.1 Migration of storage pool

In previous releases, even with migration of the storage pool available, setting the correct time was a bit tedious. There were two ways to start migration. The first one was to set the high and low migration thresholds, and migration would start automatically when the high threshold was reached. When the environment was lacking available drives, starting migration automatically may cause problems for other backups, which would use a tape drive at the same time.

So we were using the second method, which was to set a high threshold to 100% in order not to start migration automatically. And when a drive is empty, threshold is set to a low value to start migration, and set back to 100% to prevent migration, and at the same time, cancel the migration process.

With V5.3, there is now a new migration command to do the same thing. With this command, there is no need to adjust high and low thresholds continuously. You can immediately start migration for any stgpool (storage pool) at any time,
and also you can define duration for the migration to end. For the sequential storage pools, it is also possible to start reclamation before migration. (We will see this in the next demonstration.)

The command syntax for the new command is:

```
MIGRATE STGPOOL poolname DURATION=minutes RECLAIM=(no,yes)
LOWMIG=number WAIT=(no,yes)
```

From ISC:
1. Select **Storage Devices**.
2. Select Tivoli Storage Manager server and click **Use Command Line** and **Go**.
3. Enter `MIGRATE STGPOOL BACKUPPOOL DURATION=40`.

You can monitor the status by using `Q PROC`.

### 4.2.2 Reclamation of storage pool

With the previous releases, as in migration, it was also difficult to set the correct time for reclamation. Reclamation needs at least two drives when using tape and one drive and one sequential disk pool when using `RECLAIM STGPOOL`. Automatic reclamation may cause problems if there are not enough drives in the environment.

So we were setting the reclamation threshold high and low continuously to start or stop reclamation.

With V5.3, there is a new reclamation command. You can now start reclamation whenever you want, and you can stop after certain duration. Also you can specify a reclamation threshold other than a storage pool reclaim threshold.

**Note:** Reclamation works on the storage pool base. So if you have a lot of tapes that need to be reclaimed, you had better use `MOVE` instead of `RECLAIM`. The `MOVE` command does the same operation on a volume base.

The command syntax for the new command is:

```
RECLAIM STGPOOL poolname DURATION=minutes THRESHOLD=number
WAIT=(no,yes)
```

*Example:* Let us reclaim storage pool `WINDOWSTAPEPOOL` for 1 hour with threshold 80.

```
RECLAIM STGPOOL WINDOWSTAPEPOOL DURATION=60 THRESHOLD=80
```
4.2.3 Database reorganization

During daily backup, restore, and admin work, all actions have updates, inserts, or deletes of records in the Tivoli Storage Manager database. After a certain time, the database may become fragmented, and you should reorganize the database to recover the unused portion of the database.

Before V5.3, you can check whether DB needs to be reorganized by checking DB size, max reduction.

*Example:* `Q DB F=D` will create such an output.

```
Available space (MB):12
Assigned Capacity(MB):12
Maximum Extension(MB):0
Maximum Reduction(MB):8
Pct Util: 5.8
```

The above example shows that maximum reduction is 8 MB and the remaining will be 4 MB. So this database does not need to be reorganized.

```
Available space (MB):100
Assigned Capacity(MB):100
Maximum Extension(MB):0
Maximum Reduction(MB):70
Pct Util: 10
```

The above example shows that maximum reduction is 70 MB, while actually 10 MB is used. In this case, 20 MB of space is fragmented. This database needs to be reorganized.

With V5.3, there is no need to do such calculations. There is a new command which calculates and shows whether reorganization is needed and the amount of space that will be recovered. Also, the `Q DB` command has been changed such that its output reports the last estimated time and estimated recoverable space. The new command to use is `ESTIMATE DBREORGSTATS`.

The command syntax for the new command is:

```
ESTIMATE DBREORGSTATS Wait=(No,Yes)
```

The command output is as follows:

```
ANR1784I A database reorganization would reduce the database utilization by an estimated 70 MB.
```

`Q DB F=D`
The output is now as follows:

Available space (MB): 100
Assigned Capacity (MB): 100
Maximum Extension (MB): 0
Maximum Reduction (MB): 70
Pct Util: 10
Estimate of Recoverable Space (MB): 70Mb
Last Estimate of Recoverable Space (MB): 03/31/2005 13:30:22

**Hint:** This command may degrade the performance of Tivoli Storage Manager and run for several hours. So you should plan to run the commands at an appropriate time.

### 4.2.4 File Device Class to different directories

Before Tivoli Storage Manager V5.3, you can define file device class which emulates the tape features on a specified operating system directory. If the environment has different disk storages that are mounted on different directories, then you have to define several file classes to access different directories.

With Tivoli Storage Manager V5.3, you can now define several directories within the same file device class:

```sql
DEFINE DEVCLASS deviceclassname DEVTYPE=FILE MOUNTLIMIT=number MAXCAPACITY=number DIRECTORY=directory1,directory2,directory3
```

From ISC:
1. Select Storage Device.
2. Select Tivoli Storage Manager server, click View Device Classes and Go.
3. Select Action, Create Device Class and Go.
4. Select File Device Class and click Next (Figure 4-33).
5. Define device class name and directories separated by a comma (Figure 4-34).

Figure 4-33  Selecting the device class

Figure 4-34  Creating a new device class
4.2.5 Activity log management

With the previous releases, the size of the activity log can only be controlled by activity log retention period, which is in days.

With Tivoli Storage Manager V5.3, now it is possible to control the size by the size of the activity log. To set the size, the command has been changed as follows.

```
SET ACTLOGRETENTION nn MGMTSTYLE=(Date,Size)
```

The default is Date as before. When the management style is Date, nn is number of days. When the management style is Size, then nn is number of MB.

Example: To set the activity log retention to 300 MB:
```
SET ACTLOGRET 300 MGMTSTYLE=SIZE
```

4.2.6 Creating copypool

Copy of the cartridge or disk can be created by using two methods. The first method is to update the Copy Storage Pool parameter of the storage pool. The second method is to run the backup stgpool command for the storage pool.

If the first method is used, then during backup to storage pool, data is written to primary and copy pool at the same time. And depending on the parameter, Continue Copy on Error, backup may fail or continue without copy. The disadvantage of the method is that you need two drives at the same time, and since data is written to two pools at the same time, performance is a bit affected. As an advantage, the copy of data is immediately available after backup.

If the second method is used, then you can make a copy of the storage pool whenever you want. The copy is created when the command is entered. As a disadvantage, your data is in a critical situation (without copy) between backup time and the time that you enter the copy command.

For the first method, you have to change the storage pool parameter as follows:

```
UPDATE STGPOOL poolname COPYSTGPOOLS=copypool1,copypool2,copypool3
COPYCONTINUE=(Yes,No)
```

If you want the entire transaction to fail, then select copycontinue=no.

From ISC:
1. Select Storage Devices.
2. Select Tivoli Storage Manager server, click View Storage Pools and Go.
3. Select the storage pool you want to copy and click **Modify Storage Pool** and **Go**.

4. Click **Advanced Options**.

5. Fill in the Copy Storage Pool parameter and click **Apply** (Figure 4-35).

![Figure 4-35 BACKUPPOOL properties advanced options](image)

For the second method, you enter the backup command with syntax as follows:

```
BACKUP STGPPOOL primarypoolname copypoolname
PREVIEW=(Yes,No,Volumesonly)
```

**Note:** It is a good practice to run the preview=yes option first in order to see how many bytes will be copied.

From ISC:

1. Select **Storage Devices**.

2. Select Tivoli Storage Manager server, click **View Storage Pools** and **Go**.

3. Select the storage pool you want to copy and click **Backup Storage Pool** and **Go**.

4. Select **copypool** and click **OK**.
   a. Optionally, you can click **Preview Backup** (Figure 4-36).
4.2.7 Creating policy domain

In order for the client to back up its data, it should be defined in a Policy Domain. How Tivoli Storage Manager will react to the data of the client is defined by using Policy Domain attributes such as:

- Which storage pool to which that data will be first saved
- How long will it be retained
- How many versions Tivoli Storage Manager will keep
- What will be the HSM settings

Before starting to create the policy domain, you have to know which servers will back up and what policies are currently being used for different types of data.

To create the Policy Domain:

1. Select **Policy Domains and Client Nodes**.
2. Select the Tivoli Storage Manager server, click **View Policy Domains** and **Go**.
3. Click **Create the Policy Domain** and **Go**.
4. First enter the name of the policy domain and click **Next**.
5. Select storage pool for backup and archive data.

6. If you already defined clients, you can select Yes and click Next.

7. Since there are no clients defined, select No and click Next.

8. You will see the summary data for the Policy Domain; click Finish.

9. The domain is now being created. It is now time to add management class.

10. Select the policy you have just created and click Modify Policy Domain and Go.

11. You can change:
   - Domain Properties
   - Client Nodes
   - Option Sets
   - Client Node Schedules
   - Management Classes

12. Let us start to add the management class; select Management Class.

13. A standard management class is automatically created when you create a Policy Domain. The standard management class attributes are as follows:
   - Backup data are stored to the storage pool that you defined in step 5.
   - Modified is selected.
   - SHAREDSTATIC is selected.
   - Each time, backup can be taken.
   - Two versions are kept and stored for 30 days.
   - One version of each deleted file is kept and stored for 60 days.
   - Archive data is stored to the storage pool that you defined in step 5.
   - Archive data is kept for 365 days.

14. You can change or add new management classes.

15. Click Cancel on Standard Management class and click Create Management Class and Go.

16. Enter the Management Class name and definition and click Next.

17. Enter Backup settings and archive settings and click Finish.

18. You don’t have to enter all the settings.

19. If you want to make your management class be the default, then select the management class and click Make Management Class Default and Go.

20. To add the client Node, click Client Nodes

21. Click Create a client node and Go.

22. Enter the client name, Web address, and optionally Option Set or Schedule and click Next.
23. Enter password and password expiration policy and click **Next**.

24. Click **Finish**.

25. You will see (?) at the platform column. Ignore this at the moment, because it will be filled in when the client first connects to Tivoli Storage Manager server.

You can make changes on the active policy in order not to jeopardize the status of client data immediately.

### 4.2.8 Tivoli Storage Manager client remote access

Sometimes you may need to access the client from remote location in order to do backup/restore without involving local server personnel. The server may be at a remote location where you cannot access the system easily, or local IT personnel may not be well skilled to do backup/restore.

Tivoli Storage Manager offers remote access to Client code via LAN and the Backup/Archive Web client can be used. In order to use this facility, you do not need to install any extra code. All you need to do is to configure the Client side. The following demonstration shows how to configure all of the necessary things to do.

1. For Tivoli Storage Manager BA Client running on Windows, you need two services on the Windows operating system: Tivoli Storage Manager Client Acceptor and Tivoli Storage Manager Remote Client Agent.

2. First check whether these services were defined:
   a. If yes, be sure that the Tivoli Storage Manager Client Acceptor service has been started. (The Remote Client Agent will be started automatically by the Tivoli Storage Manager Client Acceptor service when you initiate the Web client.)
   b. If no, or if you are not sure of the name of the service, follow the next step.

3. You can install, modify, or remove the necessary services by using the Tivoli Storage Manager Backup-Archive GUI.

4. Start the Backup-Archive GUI:
   a. From the command line, run `c:\program files\tivoli\tsm\baclient\dsm.exe`.
   b. Start the GUI from **Start** → **All Programs** → **Tivoli Storage Manager** → **Backup-Archive GUI**.

5. When the GUI is up, select **Utilities** → **Setup Wizard** → **Help me Configure the Web Client** (Figure 4-37).
6. Click **Next**. You will see three options:
   b. Update a previously installed Web Client Agent — continue.
   c. Remove a previously installed Web Client Agent — skip to step 8.

7. If the service has already been installed, but you don’t know the name of the services:
   You can remove the service or select **Update** to get the name of the services. Simply click **Next** and on the next panel, you can find the name of the service. Then you can continue from step 2.

8. To remove the service:
   a. Select **Remove** and click **Next**.
   b. Select previously installed service and click **Next**.
   c. Click **Finish** to remove both Client Acceptor and remote client agent services.
9. To install the service, select **Install** and click **Next**.

10. Type the name of the client acceptor service (the default is **Tivoli Storage Manager Client Acceptor**).

11. Type the Tivoli Storage Manager BA Client option file path name. Or click **Browse** and find the dsm.opt file that you would like to use. (The default is c:\program files\tivoli\tsm\baclient\dsm.opt).

12. Type the port number for communication. It should not be used by any other service. (The default is 1581).

13. Type your node name and password.

14. Select the way you want your service to start. For demonstration, select **Automatically when Windows boots**.

15. Type the name for the remote client agent. (The default is Tivoli Storage Manager Remote Client Agent).

16. Select **No**.

17. Select **Yes**.

18. Click **Finish**.

19. You should see the following message: **Web Client successfully installed**.

20. If you checked the services, **My computer** → right-click → **Manage** → **Services and Applications** → **Services**, you should see two services with one of them running, as shown in Figure 4-38.

```
<table>
<thead>
<tr>
<th>Service</th>
<th>Started</th>
<th>Status</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSM Client Acceptor</td>
<td>Started</td>
<td>Manual</td>
<td>Local System</td>
</tr>
<tr>
<td>TSM Remote Client Agent</td>
<td>Started</td>
<td>Automatic</td>
<td>Local System</td>
</tr>
</tbody>
</table>
```

*Figure 4-38  Services shows Tivoli Storage Manager components*

21. Up to now, we have installed the services and our client is ready to be accessed remotely. We can now access it in two ways:

   a. Directly from the browser — skip 29.
   b. By using ISC — continue.
   c. Logon to ISC:
      
      ```
      http://isc-ip-address:8421/ibm/defaultconsole/lut/p/.scr/Login
      ```
   d. Select **Tivoli Storage Manager**.
   e. Select **Policy Domains and Client Nodes**.
   f. Click the Server name
   g. Click the Domain (the default is Standard) to expand the tree.
22. Figure 4-39 illustrates how to select a client you want to access remotely.

23. Then select **Launch Backup-Archive Client...** from the Select Action bar and click **Go**.

24. Then you will be able to access the client remotely using the Web as seen in Figure 4-40.
4.2.9 Usage report

From ISC, you can run a report to show the number of stored files and amount of storage space occupied by the client nodes.

To get such a report, follow these steps:
1. Logon to ISC console.
2. Select Reporting.
3. Click Usage Report.
4. Select the Tivoli Storage Manager server from which you would like to run your report. Click Run report (Figure 4-41).

5. As shown above in Figure 4-41, on the client basis, you can see the number of files, backup/archive, and amount of space occupied in Tivoli Storage Manager server. You can sort, filter on any column.
6. The same kind of report can also be taken by using the **Q OCCUPANCY** command (Figure 4-42).

![Image of Detailed usage report for TSM Server]

**Figure 4-42**  *Detailed usage report for TSM Server*
4.2.10 Daily report

From the Management Console, you can run several different reports to see the activity of Tivoli Storage Manager server on an hourly or daily basis.

To get a daily report (Figure 4-43), follow these steps:
1. Start management console: \textbf{Start} $\rightarrow$ \textbf{All Programs} $\rightarrow$ \textbf{Tivoli Storage Manager} $\rightarrow$ \textbf{Management console}.
2. Click the plus sign to the left of Tivoli Storage Manager.
3. Click the plus sign to the left of your Tivoli Storage Manager server.
4. Click the plus sign to the left of Server1.
5. Click the plus sign to the left of Reports.
6. Click the plus sign to the left of Operational Reports.

![Figure 4-43 Daily report](image)

7. Right-mouse click \textbf{Operational Reports} and select \textbf{New}.
8. Fill in the name of the report and click \textbf{OK}.
9. You will see all of the possible reports you may need (Figure 4-44).
10. Check the lines which you would like to see on the report.
11. Click OK.
12. You can run the report created by selecting it and choosing **Refresh using current time**.
13. This may take a few minutes.

### 4.2.11 Summary

In this chapter we have showed Client, Server, and some Administration Center demonstration scenarios. You may enhance these demonstration steps according to your customer's areas of interest.
Additional information

This appendix provides some useful additional information about products, usage, and functions.
A.1 Browser access to Tivoli Storage Manager V5.3

In response to customer transition needs, Tivoli Storage Manager Version 5.2 administrative Web interface can be used for a limited time to support customer migration activities to Tivoli Storage Manager Version 5.3.

Rules of use:

1. Customers may run concurrent instances of the Version 5.2 administrative Web interface and the Version 5.3 interfaces.

2. During the transition period, use of the Version 5.2 administrative Web interface for migration activities will be considered a supported environment; however, no functional enhancements will be made to the Version 5.2 interface, and any reported problems that require a code change to the Version 5.2 interface will not be corrected. Defects found in the base Tivoli Storage Manager server will be corrected.

3. The Version 5.2 interface does not support the new functions in the Version 5.3 interface. To take advantage of the new functions in the interface, customers must use the Version 5.3 interface.

4. The Version 5.2 interface will be available for migration purposes through March, 2006.

Installation instructions

Here are the installation instructions to follow:

1. Download the necessary files. See the proper platform below. There are two sets of files: one set of gzipped tar files for UNIX or Linux systems, and a set of zip files for Windows. The contents of the two sets of files are identical. Use the one that is most convenient.

2. Extract the contents of each archive into the appropriate directory, as specified below. The IDL and class files can be extracted into the server bin directory (the directory containing the dsmserv or dsmserv.exe executable). The image and help files should be extracted into the following directories, based on platform (in the following, SRVBIN = server bin directory):

   ▶ Platform: AIX
      Images: /usr/tivoli/tsm/server/webimages/

   ▶ Platform: HP-UX
      Images: SRVBIN/webimages/
      Help: SRVBIN/webhelp/AMENG/
Platform: Linux
Images: SRVBIN/../webimages/
Help: SRVBIN/../webhelp/en_US

Platform: Windows
Images: SRVBIN\webimage\nHelp: SRVBIN\webhelp\n
Platform: Sun
Images: SRVBIN/../webimages/
Help: SRVBIN/../webhelp/en_US

3. Load the IDL for your platform into the server by executing the following command:
   
   \texttt{dsmserv runfile platform.idl}
   
   Where platform is one of 'aix', 'hp', 'linux', 'sun', or 'windows'.

To load the IDL on an AIX operating system, issue the following command:

\texttt{dsmserv runfile aix.idl}

\textbf{Note:} Do not attempt to load the IDL file without first extracting the image and help files. Doing so will result in errors, and the load will fail without accomplishing anything.

A.2 Sample worksheets

In this section we provide the sample worksheets you might need before you start the negotiations with your customer for PoC.
Table 4-1  Client requirements worksheet

<table>
<thead>
<tr>
<th>Category</th>
<th>Client 1</th>
<th>Client 2</th>
<th>Client 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client name</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Contact information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating system</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total storage available (GB)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total storage used (GB)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GB changed per backed up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of files backed up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data compression</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backup window times</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backup number of hours</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required recovery times</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required recovery time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ITSM recovery time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GB copied per archive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of files archived</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of archives kept</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archive frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archive windows times</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archive number of hours</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of image backup</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Image backup frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of backup sets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backup set frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Policy domain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Client option set</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 4-2: Storage policy requirements worksheet

<table>
<thead>
<tr>
<th>Category</th>
<th>Example 1</th>
<th>Example 2</th>
<th>Example 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group name</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of backup versions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backup file retention period</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of deleted versions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Last deleted file version retention period</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archive retention period</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offsite copies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Onsite collocation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Offsite collocation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Image backup retention</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Backupset retention</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Additional material

This redbook refers to additional material that can be downloaded from the Internet as described below.

Locating the Web material

The Web material associated with this redbook is available in softcopy on the Internet from the IBM Redbooks Web server. Point your Web browser to:

ftp://www.redbooks.ibm.com/redbooks/SG246762

Alternatively, you can go to the IBM Redbooks Web site at:

ibm.com/redbooks

Select the Additional materials and open the directory that corresponds with the redbook form number, SG246762.

Using the Web material

The additional Web material that accompanies this redbook includes the following files:

<table>
<thead>
<tr>
<th>File name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Addmat6762.zip</td>
<td>Zipped worksheet samples</td>
</tr>
</tbody>
</table>
System requirements for downloading the Web material

The following system configuration is recommended:

**Hard disk space:** 50 KB minimum  
**Operating System:** Windows OS  
**Processor:** No prerequisites  
**Memory:** No prerequisites

How to use the Web material

Create a subdirectory (folder) on your workstation, and unzip the contents of the Web material zip file into this folder.
Related publications

The publications listed in this section are considered particularly suitable for a more detailed discussion of the topics covered in this redbook.

IBM Redbooks

For information on ordering these publications, see “How to get IBM Redbooks” on page 126. Note that some of the documents referenced here may be available in softcopy only.

- *IBM Tivoli Storage Management Concepts*, SG24-4877-03
- *IBM Tivoli Storage Manager Implementation Guide*, SG24-5416-02
- *IBM Tivoli Storage Manager 5.3 Technical Guide*, SG24-6638-00

Other publications

These publications are also relevant as further information sources:

- *IBM Tivoli Storage Manager for AIX Installation Guide Version 5.3*, GC32-1597-00
- *IBM Tivoli Storage Manager for AIX Administrator's Guide Version 5.3*, GC32-0768-03
- *IBM Tivoli Storage Manager for Windows Installation Guide Version 5.3*, GC32-1602-00
- *IBM Tivoli Storage Manager for Windows Administrator's Guide Version 5.3*, GC32-0782-03
- *IBM Tivoli Storage Manager for UNIX Backup-Archive Clients Installation and User's Guide V5.2*, GC32-0789
- *IBM Tivoli Storage Manager for UNIX and Linux*
Online resources

These Web sites and URLs are also relevant as further information sources:

- IBM Tivoli Storage Manager:
- IBM Tivoli Storage Manager Extended Edition:
- IBM Tivoli Storage Manager information center

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  Space management 3
  System Backup and Recovery 9
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custom 47
custom installation 30
IBM Tivoli Storage Manager 25
IBM Tivoli Storage Manager client for AIX 56
Proof of Concept Guide for IBM Tivoli Storage Manager Version 5.3

Installation and configuration

Including new administrative user interface

Demonstration scenarios

This IBM Redbook provides advice for Business Partners or other technical people about how to plan, implement, and demonstrate IBM Tivoli Storage Manager Version 5.3 in a proof-of-concept simulated environment.

This environment can be used to demonstrate the capabilities of the IBM Tivoli Storage Manager solutions using customer data, in order to gain customer acceptance for the next phase of the sell cycle to engage the Business Partner in a real proof-of-concept of IBM Tivoli Storage Manager.

For more information: ibm.com/redbooks