IBM Tivoli Storage Manager
for Oracle Solaris
Version 6.3.4

Installation Guide

IBM

IBM Tivoli Storage Manager
for Oracle Solaris
Version 6.3.4

Installation Guide

IBM

Note:

Before using this information and the product it supports, read the information in "Notices" on page 149.

This edition applies to Version 6.3.4 of IBM Tivoli Storage Manager (product number 5608-E01, 5608-E02, 5608-E03) and to all subsequent releases and modifications until otherwise indicated in new editions or technical newsletters. This edition replaces GC23-9784-04.

Contents

Preface

This publication contains installation and configuration instructions for the IBM®
Tivoli® Storage Manager server and client API, server languages, and other Tivoli
Storage Manager components.

Instructions for installing the Tivoli Storage Manager license, device driver, storage
agent, and the Tivoli Integrated Portal and Administration Center are in this
publication. Details about configuring Tivoli Monitoring for Tivoli Storage Manager
are also included.

Who should read this guide

This publication is intended for a system administrator installing and configuring a
Version 6.3 or later Tivoli Storage Manager server, the Operations Center, the
Administration Center, or Tivoli Monitoring for Tivoli Storage Manager, or
upgrading from Tivoli Storage Manager Version 6.1 or 6.2.

If you are upgrading an existing 5.5.x Tivoli Storage Manager server to Tivoli
Storage Manager Version 6.3 or later, see the *Upgrade and Migration Guide for V5
Servers*.

If you are upgrading a Tivoli Storage Manager Version 6.1 or Version 6.2 server to
a newer version, see Chapter 5, "Upgrading to Tivoli Storage Manager Version 6.3
or later," on page 73.

If you are upgrading an existing Tivoli Storage Manager Version 6.3 server to a
later level of Version 6.3, see Chapter 4, "Installing a Tivoli Storage Manager server
fix pack," on page 69.

If you are installing the Administration Center, see Chapter 10, "Installing and
configuring the Administration Center," on page 111.

If you are upgrading the Administration Center, see Chapter 12, "Upgrading the
Administration Center to Version 6.3 or later," on page 135.

Installable components

The IBM Tivoli Storage Manager server, client API, and licenses are required
components. Other, optional components and products are also available in
separate packages.

You can install the following components for Tivoli Storage Manager V6.3.4 or
later.
- Tivoli Storage Manager server
- Tivoli Storage Manager server languages
- Tivoli Storage Manager licenses
- Tivoli Storage Manager devices
- Tivoli Storage Manager storage agent
- Tivoli Storage Manager Administration Center

It is possible to install a Tivoli Storage Manager server and the Administration Center on the same system, provided that you have sufficient resources for both.

Table 1 describes all the installable components. These components are in several different installation packages.

Table 1. Tivoli Storage Manager installable components

Tivoli Storage Manager component:	Description:	Additional information:
Server (required)	Includes the database, client API, GSKit, and tools to help you configure and manage Tivoli Storage Manager.	See the Tivoli Storage Manager server overview in the *Administrator's Guide*.
Language package (optional)	Each language package (one for each language) contains language-specific information for the server.	See "Installing server language packages" on page 38.
Licenses (required)	Includes support for all Tivoli Storage Manager licensed features. After you install this package, you must configure the licenses you purchased.	See the chapter on managing server operations in the *Administrator's Guide*.
Devices (optional)	Extends Tivoli Storage Manager media management capability.	The Tivoli Storage Manager device driver is preferred for use with the Tivoli Storage Manager server. See the chapter on adding devices in the *Administrator's Guide*. A list of devices supported by this driver is available from the Tivoli Storage Manager website, at http://www.ibm.com/support/entry/portal/Overview/Software/Tivoli/Tivoli_Storage_Manager.
Storage agent (optional)	Installs the component that allows client systems to write data directly to, or read data directly from, storage devices that are attached to a storage area network (SAN). **Remember:** The IBM Tivoli Storage Manager for Storage Area Networks is a separately licensed product.	See the *Storage Agent User's Guide*.

Table 1. Tivoli Storage Manager installable components (continued)

Tivoli Storage Manager component:	Description:	Additional information:
Administration Center (optional)	Installs the following components automatically to help you configure and manage Tivoli Storage Manager: • Tivoli Integrated Portal • Integrated Solutions Console • WebSphere® Application Server • Tivoli Storage Manager client performance monitor Optional components such as Tivoli Common Reporting are also available. **Tip:** The Administration Center is on a separate DVD.	See "System requirements" on page 112.

Publications

Publications for the IBM Tivoli Storage Manager family of products are available online. The Tivoli Storage Manager product family includes IBM Tivoli Storage FlashCopy® Manager, IBM Tivoli Storage Manager for Space Management, IBM Tivoli Storage Manager for Databases, and several other storage management products from IBM Tivoli.

To search all publications, search across the appropriate Tivoli Storage Manager information center:

• Version 6.3 information center: http://pic.dhe.ibm.com/infocenter/tsminfo/v6r3
• Version 6.4 information center: http://pic.dhe.ibm.com/infocenter/tsminfo/v6r4

You can download PDF versions of publications from the Tivoli Storage Manager information center or from the IBM Publications Center at http://www.ibm.com/shop/publications/order/.

Go to Tivoli Documentation Central to find information centers that contain official product documentation for current and previous versions of Tivoli products, including the Tivoli Storage Manager product family. You can find Tivoli Documentation Central at http://www.ibm.com/tivoli/documentation.

You can also order some related publications from the IBM Publications Center website at http://www.ibm.com/shop/publications/order/. The website provides information about ordering publications from countries other than the United States. In the United States, you can order publications by calling 1-800-879-2755.

Tivoli Storage Manager publications

The following tables list the publications that make up the Tivoli Storage Manager library.

Table 2. Tivoli Storage Manager server publications

Publication title	Order number
IBM Tivoli Storage Manager for AIX Installation Guide	GC23-9781
IBM Tivoli Storage Manager for AIX Administrator's Guide	SC23-9769
IBM Tivoli Storage Manager for AIX Administrator's Reference	SC23-9775
IBM Tivoli Storage Manager for HP-UX Installation Guide	GC23-9782
IBM Tivoli Storage Manager for HP-UX Administrator's Guide	SC23-9770
IBM Tivoli Storage Manager for HP-UX Administrator's Reference	SC23-9776
IBM Tivoli Storage Manager for Linux Installation Guide	GC23-9783
IBM Tivoli Storage Manager for Linux Administrator's Guide	SC23-9771
IBM Tivoli Storage Manager for Linux Administrator's Reference	SC23-9777
IBM Tivoli Storage Manager for Oracle Solaris Installation Guide	GC23-9784
IBM Tivoli Storage Manager for Oracle Solaris Administrator's Guide	SC23-9772
IBM Tivoli Storage Manager for Oracle Solaris Administrator's Reference	SC23-9778
IBM Tivoli Storage Manager for Windows Installation Guide	GC23-9785
IBM Tivoli Storage Manager for Windows Administrator's Guide	SC23-9773
IBM Tivoli Storage Manager for Windows Administrator's Reference	SC23-9779
IBM Tivoli Storage Manager for z/OS Media Installation and User's Guide	SC27-4018
IBM Tivoli Storage Manager Upgrade and Migration Guide for V5 Servers	GC27-4017
IBM Tivoli Storage Manager Integration Guide for Tivoli Storage Manager FastBack®	SC27-2828

Table 3. Tivoli Storage Manager storage agent publications

Publication title	Order number
IBM Tivoli Storage Manager for SAN for AIX Storage Agent User's Guide	SC23-9797
IBM Tivoli Storage Manager for SAN for HP-UX Storage Agent User's Guide	SC23-9798
IBM Tivoli Storage Manager for SAN for Linux Storage Agent User's Guide	SC23-9799
IBM Tivoli Storage Manager for SAN for Oracle Solaris Storage Agent User's Guide	SC23-9800
IBM Tivoli Storage Manager for SAN for Windows Storage Agent User's Guide	SC23-9553

Table 4. Tivoli Storage Manager client publications

Publication title	Order number
IBM Tivoli Storage Manager for UNIX and Linux: Backup-Archive Clients Installation and User's Guide	SC23-9791

Table 4. Tivoli Storage Manager client publications (continued)

Publication title	Order number
IBM Tivoli Storage Manager for Windows: Backup-Archive Clients Installation and User's Guide	SC23-9792
IBM Tivoli Storage Manager Using the Application Programming Interface	SC23-9793
IBM Tivoli Storage Manager for Space Management for UNIX and Linux: User's Guide	SC23-9794
IBM Tivoli Storage Manager HSM for Windows Administration Guide	SC23-9795

Table 5. Tivoli Storage Manager data protection publications

Publication title	Order number
IBM Tivoli Storage Manager for Databases: Data Protection for Microsoft SQL Server Installation and User's Guide	GC27-4010
IBM Tivoli Storage Manager for Databases: Data Protection for Oracle for UNIX and Linux Installation and User's Guide	SC27-4019
IBM Tivoli Storage Manager for Databases: Data Protection for Oracle for Windows Installation and User's Guide	SC27-4020
IBM Tivoli Storage Manager for Mail: Data Protection for Microsoft Exchange Server Installation and User's Guide	GC27-4009
IBM Tivoli Storage Manager for Mail: Data Protection for Lotus Domino® UNIX and Linux Installation and User's Guide	SC27-4021
IBM Tivoli Storage Manager for Mail: Data Protection for Lotus Domino for Windows Installation and User's Guide	SC27-4022
IBM Tivoli Storage Manager for Enterprise Resource Planning: Data Protection for SAP Installation and User's Guide for DB2	SC33-6341
IBM Tivoli Storage Manager for Enterprise Resource Planning: Data Protection for SAP Installation and User's Guide for Oracle	SC33-6340
IBM Tivoli Storage Manager for Virtual Environments Installation and User's Guide	SC27-2898
IBM Tivoli Storage Manager for Microsoft SharePoint Guide	N/A

Table 6. IBM Tivoli Storage Manager troubleshooting and tuning publications

Publication title	Order number
IBM Tivoli Storage Manager Problem Determination Guide	GC23-9789
IBM Tivoli Storage Manager Optimizing Performance	GC23-9788
IBM Tivoli Storage Manager Client Messages and Application Programming Interface Return Codes	SC27-2878
IBM Tivoli Storage Manager Server Messages and Error Codes	SC27-2877
IBM Tivoli Storage Manager for Mail: Data Protection for Microsoft Exchange Server Messages	GC27-4011
IBM Tivoli Storage Manager for Databases: Data Protection for Microsoft SQL Server Messages	GC27-4012
IBM Tivoli Storage Manager for Databases: Data Protection for Oracle Messages	SC27-4014
IBM Tivoli Storage Manager for Mail: Data Protection for Lotus Domino Messages	SC27-4015

Table 6. IBM Tivoli Storage Manager troubleshooting and tuning publications (continued)

Publication title	Order number
IBM Tivoli Storage Manager for Enterprise Resource Planning: Data Protection for SAP Messages	SC27-4016

Note: You can find information about IBM System Storage® Archive Manager at the Tivoli Storage Manager v6.3.0 information center.

Support information

You can find support information for IBM products from various sources.

Start at the IBM Support Portal: http://www.ibm.com/support/entry/portal/. You can select the products that you are interested in and search for a wide variety of relevant information.

Getting technical training

Information about Tivoli technical training courses is available online.

Go to the following websites to sign up for training, ask questions, and interact with others who use IBM storage products.

Tivoli software training and certification
Choose from instructor led, online classroom training, self-paced Web classes, Tivoli certification preparation, and other training options at http://www.ibm.com/software/tivoli/education/

Tivoli Support Technical Exchange
Technical experts share their knowledge and answer your questions in webcasts at http://www.ibm.com/software/sysmgmt/products/support/supp_tech_exch.html.

Storage Management community
Interact with others who use IBM storage management products at http://www.ibm.com/developerworks/servicemanagement/sm/index.html

Global Tivoli User Community
Share information and learn from other Tivoli users throughout the world at http://www.tivoli-ug.org/.

IBM Education Assistant
View short "how to" recordings designed to help you use IBM software products more effectively at http://publib.boulder.ibm.com/infocenter/ieduasst/tivv1r0/index.jsp

Searching knowledge bases

If you have a problem with your Tivoli Storage Manager family product, there are several knowledge bases that you can search.

Begin by searching the Tivoli Storage Manager Information Center at http://pic.dhe.ibm.com/infocenter/tsminfo/v6r3. From this website, you can search the current Tivoli Storage Manager documentation.

Searching the Internet

If you cannot find an answer to your question in the IBM Tivoli Storage Manager information center, search the Internet for the information that might help you resolve the problem.

To search multiple Internet resources, go to the IBM support website at http://www.ibm.com/support/entry/portal/.

You can search for information without signing in. Sign in using your IBM ID and password if you want to customize the site based on your product usage and information needs. If you do not already have an IBM ID and password, click **Sign in** at the top of the page and follow the instructions to register.

From the support website, you can search various resources including:
* IBM technotes.
* IBM downloads.
* IBM Redbooks® publications.
* IBM Authorized Program Analysis Reports (APARs). Select the product and click **Downloads** to search the APAR list.

If you still cannot find a solution to the problem, you can search forums and newsgroups on the Internet for the latest information that might help you find problem resolution.

An independent user discussion list, ADSM-L, is hosted by Marist College. You can subscribe by sending an email to listserv@vm.marist.edu. The body of the message must contain the following text: SUBSCRIBE ADSM-L *your_first_name your_family_name*.

To share your experiences and learn from others in the Tivoli Storage Manager and Tivoli Storage FlashCopy Manager user communities, go to Service Management Connect (http://www.ibm.com/developerworks/servicemanagement/sm/index.html). From there you can find links to product wikis and user communities.

Using IBM Support Assistant

IBM Support Assistant is a complimentary software product that can help you with problem determination. It is available for some Tivoli Storage Manager and Tivoli Storage FlashCopy Manager products.

To learn about which products are supported, go to the IBM Support Assistant download web page at http://www.ibm.com/software/support/isa/download.html.

IBM Support Assistant helps you gather support information when you must open a problem management record (PMR), which you can then use to track the problem. The product-specific plug-in modules provide you with the following resources:

- Support links
- Education links
- Ability to submit problem management reports

You can find more information at the IBM Support Assistant website:

http://www.ibm.com/software/support/isa/

You can also install the stand-alone IBM Support Assistant application on any workstation. You can then enhance the application by installing product-specific plug-in modules for the IBM products that you use. Find add-ons for specific products at http://www.ibm.com/support/docview.wss?uid=swg27012689.

Finding product fixes

A product fix to resolve your problem might be available from the IBM software support website.

You can determine what fixes are available by checking the IBM software support website at http://www.ibm.com/support/entry/portal/.
- If you previously customized the site based on your product usage:
  1. Click the link for your product, or a component for which you want to find a fix.
  2. Click **Downloads**, and then click **Fixes by version**.
- If you have not customized the site based on your product usage, click **Downloads** and search for your product.

Receiving notification of product fixes

You can receive notifications about fixes, flashes, upgrades, and other news about IBM products.

To sign up to receive notifications about IBM products, follow these steps:
1. From the support page at http://www.ibm.com/support/entry/portal/, click **Sign in to create, manage, or view your subscriptions** in the **Notifications** pane.
2. Sign in using your IBM ID and password. If you do not have an ID and password, click **register now** and complete the registration process.
3. Click **Manage all my subscriptions** in the **Notifications** pane.
4. Click the **Subscribe** tab and then click **Tivoli**.
5. Select the products for which you want to receive notifications and click **Continue**.
6. Specify your notification preferences and click **Submit**.

Contacting IBM Software Support

You can contact IBM Software Support if you have an active IBM subscription and support contract and if you are authorized to submit problems to IBM.

To obtain help from IBM Software Support, complete the following steps:
1. Ensure that you have completed the following prerequisites:
   a. Set up a subscription and support contract.
   b. Determine the business impact of your problem.
   c. Describe your problem and gather background information.

2. Follow the instructions in "Submitting the problem to IBM Software Support" on page xiv.

Setting up a subscription and support contract

Set up a subscription and support contract. The type of contract that you need depends on the type of product you have.

For IBM distributed software products (including, but not limited to, IBM Tivoli, Lotus®, and Rational® products, as well as IBM DB2® and IBM WebSphere products that run on Microsoft Windows or on operating systems such as AIX or Linux), enroll in IBM Passport Advantage® in one of the following ways:

* **Online:** Go to the Passport Advantage website at http://www.ibm.com/ software/lotus/passportadvantage/, click **How to enroll**, and follow the instructions.
* **By telephone:** You can call 1-800-IBMSERV (1-800-426-7378) in the United States. For the telephone number to call in your country, go to the IBM Software Support Handbook web page at http://www14.software.ibm.com/webapp/ set2/sas/f/handbook/home.html and click **Contacts**.

Determining the business impact

When you report a problem to IBM, you are asked to supply a severity level. Therefore, you must understand and assess the business impact of the problem you are reporting.

Severity 1	**Critical** business impact: You are unable to use the program, resulting in a critical impact on operations. This condition requires an immediate solution.
Severity 2	**Significant** business impact: The program is usable but is severely limited.
Severity 3	**Some** business impact: The program is usable with less significant features (not critical to operations) unavailable.
Severity 4	**Minimal** business impact: The problem causes little impact on operations, or a reasonable circumvention to the problem has been implemented.

Describing the problem and gathering background information

When explaining a problem to IBM, it is helpful to be as specific as possible. Include all relevant background information so that IBM Software Support specialists can help you solve the problem efficiently.

To save time, know the answers to these questions:

* What software versions were you running when the problem occurred?
* Do you have logs, traces, and messages that are related to the problem symptoms? IBM Software Support is likely to ask for this information.
* Can the problem be re-created? If so, what steps led to the failure?
* Have any changes been made to the system? For example, hardware, operating system, networking software, and so on.
* Are you using a workaround for this problem? If so, be prepared to explain it when you report the problem.

Submitting the problem to IBM Software Support

You can submit the problem to IBM Software Support online or by telephone.

Online

Go to the IBM Software Support website at http://www.ibm.com/
support/entry/portal/Open_service_request/Software/
Software_support_(general). Sign in to access IBM Service Requests and
enter your information into the problem submission tool.

By telephone

For the telephone number to call in your country, go to the IBM Software
Support Handbook at http://www14.software.ibm.com/webapp/set2/sas/
f/handbook/home.html and click **Contacts**.

New for Tivoli Storage Manager Version 6.3.4

This section summarizes changes that have been made to IBM Tivoli Storage Manager Version 6.3.4. These changes affect the Tivoli Storage Manager server, the Operations Center, the Administration Center, Tivoli Monitoring for Tivoli Storage Manager, and the upgrade to Version 6.3 or later. Any updates that have been made to the information since the previous edition are marked with a vertical bar (|) in the margin.

The following installation-related features are new for Tivoli Storage Manager in Version 6.3.4. For a complete list of new Version 6.3.4 features, see the "What's new in the products" topic in the Tivoli Storage Manager information center at http://pic.dhe.ibm.com/infocenter/tsminfo/v6r3.

End user license agreement (EULA)
>   The license agreement no longer needs to be accepted for the Administration Center and for the Tivoli Monitoring for Tivoli Storage Manager feature. The Tivoli Storage Manager Version 6.3 or later server installation wizard now has a separate license agreement for the following products:
>   - Tivoli Storage Manager
>   - Tivoli Storage Manager Extended Edition
>   - System Storage Archive Manager
>   - Tivoli Storage Manager for Storage Area Networks

Tivoli Storage Manager migration to V6.3.4 or later on Linux x86_64
>   You can now migrate a Tivoli Storage Manager V5 server that runs on an AIX®, HP-UX, or Solaris operating system to V6.3.4 or later on a Linux x86_64 operating system. Depending on your hardware and software environment, this migration procedure might be useful for achieving server consolidation, load balancing, or standardization on the Linux operating system. For more information about the advantages of migrating the server, see the server database updates overview section in the *Upgrade and Migration Guide for V5 Servers*.

Operations Center not supported
>   The Tivoli Storage Manager Operations Center is a new web-based user interface for managing a storage environment. You can use the Operations Center to identify potential issues at a glance, manage alerts, and access the Tivoli Storage Manager command line. The Administration Center interface is also available, but the Operations Center is the preferred monitoring interface.
>
>   The Operations Center cannot be installed on Oracle Solaris, but can be used to manage Oracle Solaris servers that have a Tivoli Storage Manager V6.3.4 or later server installed.

Tivoli Storage Manager V6.4 code levels
>   Tivoli Storage Manager Version 6.4 is made up of the following components and code levels:
>   - Backup-archive client at V6.4
>   - Application programming interface (API) at V6.4
>   - Server at V6.3.4, including Administration Center, Tivoli Monitoring for Tivoli Storage Manager, and device driver components, also at V6.3.4

- Operations Center at V6.4.1

Part 1. Installing and upgrading the server

Install and upgrade the Tivoli Storage Manager server.

Planning to install	→	Installing components	→	Taking the first steps
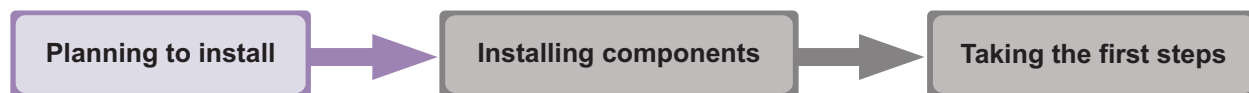
Figure 1. As highlighted in the figure, you are in the planning to install the Tivoli Storage Manager server section. Review this section carefully to ensure that you have the system and other requirements needed to install Tivoli Storage Manager.

Chapter 1. Planning to install the Tivoli Storage Manager server

Install the Tivoli Storage Manager server software on the computer that manages storage devices and install the Tivoli Storage Manager client software on every workstation that transfers data to Tivoli Storage Manager server-managed storage.

Tivoli Storage Manager server maintenance releases, client software, and publications are available from the Tivoli Storage Manager website at http://www.ibm.com/support/entry/portal/Overview/Software/Tivoli/Tivoli_Storage_Manager.

Allow approximately 30 - 45 minutes to install a Tivoli Storage Manager Version 6.3 or later server, using this guide.

An upgrade from V6.1.x, V6.2.x, or V6.3.x to V6.3 or later takes approximately 20 - 50 minutes. Your environment might produce different results than that obtained in the labs.

The following figure illustrates the main parts for installing a new Tivoli Storage Manager server.

| Planning | Preview and verify server requirements | Installing | Select a method to install the software | First steps | Configure and start the server, register licenses, prepare for backups |
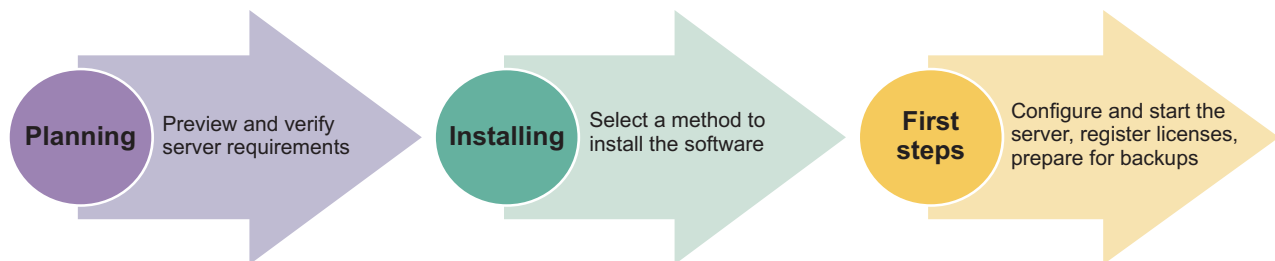
What you should know first

Before installing IBM Tivoli Storage Manager, be familiar with your operating systems, storage devices, communication protocols, and system configurations.

The following figure illustrates an overview of the installation, upgrade, and migration process.

Installing the Tivoli Storage Manager server

I want to...

Install a new release	Install a fix pack update	Upgrade or migrate an existing version
Plan for the installation	Download the code from FTP	Plan the upgrade or migration
Choose an installation method	Install the code	Choose an upgrade or migration method
Complete post-installation tasks		Complete the upgrade or migration process

Optional

- Install Tivoli Monitoring for Tivoli Storage Manager
- Install the Operations Center
- Install the Administration Center

Begin backing up data

Figure 2. Installation, upgrade, migration overview

Table 7. Upgrade information

To upgrade from this version	To this version	See this information
V6.3 or later	V6.3 or later	Chapter 4, "Installing a Tivoli Storage Manager server fix pack," on page 69
V6.2	V6.3 or later	"Upgrading from Tivoli Storage Manager V6.2 to V6.3 or later" on page 74

Table 7. Upgrade information (continued)

To upgrade from this version	To this version	See this information
V6.1	V6.3 or later	"Upgrading from Tivoli Storage Manager V6.1 to V6.3 or later" on page 79
V5.5	V6.3 or later	*Upgrade and Migration Guide for V5 Servers*

If you are migrating a Tivoli Storage Manager server, see the following documentation:

- V5 server on an AIX, HP-UX, or Solaris operating system to V6.3.4 or later on a Linux x86_64 operating system, see the *Upgrade and Migration Guide for V5 Servers*.

Restriction: You can install and run the Version 6.3 or later server on a system that already has DB2 installed on it, whether DB2 was installed independently or as part of some other application, with some restrictions. For details, see "Compatibility of the Tivoli Storage Manager server with other DB2 products on the system" on page 8.

Experienced DB2 administrators can choose to perform advanced SQL queries and use DB2 tools to monitor the database. Do not, however, use DB2 tools to change DB2 configuration settings from those that are preset by Tivoli Storage Manager, or alter the DB2 environment for Tivoli Storage Manager in other ways, such as with other products. The Tivoli Storage Manager Version 6.3 or later server has been built and tested extensively using the data definition language (DDL) and database configuration that Tivoli Storage Manager deploys.

Attention: Do not alter the DB2 software that is installed with Tivoli Storage Manager installation packages and fix packs. Do not install or upgrade to a different version, release, or fix pack of DB2 software because doing so can damage the database.

System requirements for the Tivoli Storage Manager server

The Tivoli Storage Manager server can require a large amount of memory, network bandwidth, and processor resources. In many cases, the server performs best when other applications are not installed on the same system.

Hardware requirements

These tables list the minimum hardware and software requirements for the installation of a Tivoli Storage Manager server. Use these requirements as a starting point. You can use the prerequisite checker to verify most of the requirements. See "Running the installation prerequisite checker" on page 7. You can find the most current information about system requirements at Tivoli Storage Manager Supported Operating Systems.

See *Tivoli Storage Manager Optimizing Performance* for server configuration guidelines and best practices.

Table 8 describes the minimum hardware requirements that are needed for a Solaris system. For more details about planning disk space, see "Capacity planning" on page 10.

Table 8. Hardware requirements

Type of hardware	Hardware requirements
Hardware	One of the following processors is required: • Ultra SPARC-based processors (sun4u architecture) • Ultra SPARC-based processors (sun4v architecture)
Disk space	The following list is the minimum disk space for Ultra SPARC-based processors (sun4u and sun4v architecture) for the respective directories and logs: • 5 MB for the /var directory • 30 MB for the /opt directory if you create mount points • 2 GB for the /opt/tivoli/tsm directory • 600 MB for the /tmp directory • 300 MB for the /usr directory • 2 GB in the home directory 　**Tip:** Expect to use more space for problem determination. Significant additional disk space is required for database and log files. The size of the database depends on the number of client files to be stored and the method by which the server manages them. The default active log space is 16 GB, the minimum that is needed for most workloads and configurations. Allocate at least three times the active log space for the archive log (48 GB). Ensure that you have sufficient resources if you are using data deduplication or expect a heavy client workload. For optimal performance and to facilitate I/O, specify at least two equally sized containers or Logical Unit Numbers (LUNs) for the database. See *Optimizing Performance* for more information about the configuration of directories for the database. In addition, each active log and archive log should have its own container or LUN. Ensure that you see the capacity planning section for more details about disk space.
Memory	• 12 GB. • 16 GB if you are using data deduplication. • At least 32 GB for heavily used servers. Using 32 GB or more of memory enhances performance of the Tivoli Storage Manager server database inventory. • If you plan to run multiple instances, each instance requires the memory listed for one server. Multiply the memory for one server by the number of instances planned for the system. • Node replication processing requires additional memory. Use a minimum of 32 GB of memory for node replication without data deduplication. Node replication with data deduplication requires a minimum of 64 GB of memory. **Tip:** Ensure that there is at least twice as much swap space allocated as there is physical memory on the system.

Software requirements

Table 9 describes the minimum software requirements needed for your Solaris system.

Table 9. Software requirements

Type of software	Minimum software requirements
Operating system	Oracle Solaris 10, running in 64-bit mode on an Ultra Sparc system with sun4u or sun4v architecture • Patch 118822-25 • If raw devices are used, patch 125100-07
Communication protocol	TCP/IP
Devices and drivers	If you have an IBM 3570, 3590, 3592, or Ultrium tape library or drive, install the most current device driver. Configure the device driver before you use the Tivoli Storage Manager server with tape devices. You can locate IBM device drivers at the Fix Central website. 1. Go to the Fix Central website: http://www.ibm.com/support/fixcentral/. 2. Select **Storage Systems** for the Product Group. 3. Select **Tape Systems** for the Product Family. 4. Select **Tape device drivers and software** for the Product Type. 5. Select **Tape device drivers** for the Product. 6. Select your operating system for the Platform.
Gunzip utility	The gunzip utility must be available on your system before you install or upgrade the Tivoli Storage Manager Version 6 server. Ensure that the gunzip utility is installed and the path to it is set in the PATH environment variable.
Other software	Korn Shell (ksh)

See "Using Solaris zones" on page 36 to create a Solaris Zone and install Tivoli Storage Manager in that zone.

Running the installation prerequisite checker

The installation prerequisite checker is an optional tool that verifies the operating system, the amount of free disk space for the installation, and other prerequisites.

To ensure that your system environment is appropriate for the installation, you can run the prerequisite checker before each installation.

Tip: The prerequisite checker verifies only the minimum memory that is necessary. More memory is required for additional tasks.

The prerequisite checker presents a summary of results at the end of the check. Any changes that are required in your environment before the installation are listed. Any new directories that are required for the installation are created.

To run the prerequisite checker, complete the following steps.
1. Ensure that the appropriate installation package is downloaded and that its files are extracted. A prerequisite checker is part of the installation package.

2. Choose the graphical interface (the default) or console method to start the installation, and follow the wizard instructions to complete the installation:

   - Issue this command to start the installation wizard using a graphical interface:

     ```
     ./prereqcheck.bin
     ```

   - Issue this command to start the installation wizard using the console method:

     ```
     ./prereqcheck.bin -i console
     ```

3. Select the language for the prerequisite checker user interface.

4. In the welcome and disclaimer panels, review the statements and accept them.

If the Prerequisite Results page indicates that your system passed the checks, you are ready to start the installation.

If an error message is shown in the Prerequisite Results page, make the required corrections before continuing with the installation. The summary page lists the errors and directs you to an error log file.

Compatibility of the Tivoli Storage Manager server with other DB2 products on the system

You can install other products that deploy and use DB2 products on the same system as the Tivoli Storage Manager Version 6.3 or later server on AIX, HP-UX, Linux, and Oracle Solaris platforms, with some limitations.

To install and use other products that use a DB2 product on the same system as the Tivoli Storage Manager server, ensure that the following criteria are met:

Table 10. Compatibility of the Tivoli Storage Manager server with other DB2 products on the system

Criterion	Instructions
Version level	The other products that use a DB2 product must use DB2 version 9 or later. DB2 products include product encapsulation and segregation support beginning with Version 9. Starting with this version, you can run multiple copies of DB2 products, at different code levels, on the same system. For details, see the information about multiple DB2 copies: http://pic.dhe.ibm.com/infocenter/db2luw/v9r7.

Table 10. Compatibility of the Tivoli Storage Manager server with other DB2 products on the system (continued)

Criterion	Instructions
User IDs and directories	Ensure that the user IDs, fence user IDs, installation location, other directories, and related information are not shared across DB2 installations. Your specifications must be different from the IDs and locations that you used for the Tivoli Storage Manager server installation and configuration. If you used the **dsmicfgx** wizard or **dsmupgdx** wizard to configure Version 6.3 or later, or upgrade the server from Version 5.5, these are values that you entered when running the wizard. If you used the manual configuration for Version 6.3 or later or upgrade from Version 5.5 procedures, review the procedures that you used if necessary to recall the values that were used for the server.
Resource allocation	Consider the resources and capability of the system compared to the requirements for both the Tivoli Storage Manager server and the other applications that use the DB2 product. To provide sufficient resources for the other DB2 applications, you might have to change the Tivoli Storage Manager server settings so that the server uses less system memory and resources. Similarly, if the workloads for the other DB2 applications compete with the Tivoli Storage Manager server for processor or memory resources, the performance of the server in handling the expected client workload or other server operations might be adversely affected. To segregate resources and provide more capability for the tuning and allocation of processor, memory, and other system resources for multiple applications, consider using logical partition (LPAR), workload partition (WPAR), or other virtual workstation support. For example, run a DB2 application on its own virtualized system.

Worksheets for planning details for the Tivoli Storage Manager server

You can use the work sheets to help you plan the amount and location of storage needed for the Tivoli Storage Manager server. You can also use them to keep track of names and user IDs.

See *Tivoli Storage Manager Optimizing Performance* for server configuration guidelines and best practices.

Item	Space required	Number of directories	Location of directories
The database			

Installing the Tivoli Storage Manager server

Item	Space required	Number of directories	Location of directories
Active log			
Archive log			
Optional: Log mirror for the active log			
Optional: Secondary archive log (failover location for archive log)			

Item	Names and user IDs	Location
The *instance user ID* for the server, which is the ID you use to start and run the Tivoli Storage Manager server		
The *home directory* for the server, which is the directory that contains the instance user ID		
The database instance name		
The *instance directory* for the server, which is a directory that contains files specifically for this server instance (the server options file and other server-specific files)		
Server name, use a unique name for each server		

Capacity planning

Capacity planning for Tivoli Storage Manager includes managing resources such as the database and recovery log. To maximize resources as part of capacity planning, you must estimate space requirements for the database and the recovery log.

For information about the benefits of deduplication and guidance on how to make effective use of the Tivoli Storage Manager deduplication feature, see Optimizing Performance.

Estimating space requirements for the database

To estimate space requirements for the database, you can use the maximum number of files that can be in server storage at one time or you can use storage pool capacity.

Consider using at least 25 GB for the initial database space. Provision file system space appropriately. A database size of 25 GB is adequate for a test environment or a library-manager-only environment. For a production server supporting client workloads, the database size is expected to be larger. If you use random-access disk (DISK) storage pools, more database and log storage space is needed than for sequential-access storage pools.

The maximum size of the Tivoli Storage Manager database is 4 TB.

For information about sizing the database in a production environment that is based on the number of files and on storage pool size, see the following topics.

Estimating database space requirements based on the number of files

If you can estimate the maximum number of files that might be in server storage at a time, you can use that number to estimate space requirements for the database.

To estimate space requirements that is based on the maximum number of files in server storage, use the following guidelines:

- 600 - 1000 bytes for each stored version of a file, including image backups.

  Restriction: The guideline does not include space that is used during data deduplication.
- 100 - 200 bytes for each cached file, copy storage pool file, active-data pool file, and deduplicated file.
- Additional space is required for database optimization to support varying data-access patterns and to support server back-end processing of the data. The amount of extra space is equal to 50% of the estimate for the total number of bytes for file objects.

In the following example for a single client, the calculations are based on the maximum values in the preceding guidelines. The examples do not take into account that you might use file aggregation. In general, when you aggregate small files, it reduces the amount of required database space. File aggregation does not affect space-managed files.

1. Calculate the number of file versions. Add each of the following values to obtain the number of file versions:
   a. Calculate the number of backed-up files. For example, as many as 500,000 client files might be backed up at a time. In this example, storage policies are set to keep up to three copies of backed up files:

      ```
      500,000 files * 3 copies = 1,500,000 files
      ```
   b. Calculate the number of archive files. For example, as many as 100,000 client files might be archived copies.

   c. Calculate the number of space-managed files. For example, as many as 200,000 client files might be migrated from client workstations.

   Using 1000 bytes per file, the total amount of database space that is required for the files that belong to the client is 1.8 GB:

   ```
   (1,500,000 + 100,000 + 200,000) * 1000 = 1.8 GB
   ```
2. Calculate the number of cached files, copy storage-pool files, active-data pool files, and deduplicated files:
   a. Calculate the number of cached copies. For example, caching is enabled in a 5 GB disk storage pool. The high migration threshold of the pool is 90% and the low migration threshold of the pool is 70%. Thus, 20% of the disk pool, or 1 GB, is occupied by cached files.

      If the average file size is about 10 KB, approximately 100,000 files are in cache at any one time:

      ```
      100,000 files * 200 bytes = 19 MB
      ```
   b. Calculate the number of copy storage-pool files. All primary storage pools are backed up to the copy storage pool:

      ```
      (1,500,000 + 100,000 + 200,000) * 200 bytes = 343 MB
      ```

   c. Calculate the number of active storage-pool files. All the active
      client-backup data in primary storage pools is copied to the active-data
      storage pool. Assume that 500,000 versions of the 1,500,000 backup files in
      the primary storage pool are active:

```
500,000 * 200 bytes = 95 MB
```

   d. Calculate the number of deduplicated files. Assume that a deduplicated
      storage pool contains 50,000 files:

```
50,000 * 200 bytes = 10 MB
```

Based on the preceding calculations, about 0.5 GB of extra database space is
required for the client's cached files, copy storage-pool files, active-data pool
files, and deduplicated files.

3. Calculate the amount of extra space that is required for database optimization.
   To provide optimal data access and management by the server, extra database
   space is required. The amount of extra database space is equal to 50% of the
   total space requirements for file objects.

```
(1.8 + 0.5) * 50% = 1.2 GB
```

4. Calculate the total amount of database space that is required for the client. The
   total is approximately 3.5 GB:

```
1.8 + 0.5 + 1.2 = 3.5 GB
```

5. Calculate the total amount of database space that is required for all clients. If
   the client that was used in the preceding calculations is typical and you have
   500 clients, for example, you can use the following calculation to estimate the
   total amount of database space that is required for all clients:

```
500 * 3.5 = 1.7 TB
```

Tip: In the preceding examples, the results are estimates. The actual size of the
database might differ from the estimate because of factors such as the number of
directories and the length of the path and file names. Periodically monitor your
database and adjust its size as necessary.

During normal operations, the Tivoli Storage Manager server might require
temporary database space. This space is needed for the following reasons:

- To hold the results of sorting or ordering that are not already being kept and
  optimized in the database directly. The results are temporarily held in the
  database for processing.
- To give administrative access to the database through one of the following
  methods:
  - A DB2 open database connectivity (ODBC) client
  - An Oracle Java™ database connectivity (JDBC) client
  - Structured Query Language (SQL) to the server from an administrative-client
    command line

Consider using an extra 50 GB of temporary space for every 500 GB of space for
file objects and optimization. See the guidelines in the following table. In the
example that is used in the preceding step, a total of 1.7 TB of database space is
required for file objects and optimization for 500 clients. Based on that calculation,
200 GB is required for temporary space. The total amount of required database
space is 1.9 TB.

Database size	Minimum temporary-space requirement
< 500 GB	50 GB
≥ 500 GB and < 1 TB	100 GB

Database size	Minimum temporary-space requirement
≥ 1 TB and < 1.5 TB	150 GB
≥ 1.5 and < 2 TB	200 GB
≥ 2 and < 3 TB	250 - 300 GB
≥ 3 and < 4 TB	350 - 400 GB

Estimating database space requirements based on storage pool capacity

To estimate database space requirements based on storage pool capacity, use a ratio of 1 - 5%. For example, if you require 200 TB of storage pool capacity, the size of your database is expected to be 2 - 10 TB. As a general rule, make your database as large as possible to prevent running out of space. If you run out of database space, server operations and client-store operations can fail.

The database manager and temporary space

The Tivoli Storage Manager server database manager manages and allocates system memory and disk space for the database. The amount of database space you require depends on the amount of system memory available and the server workload.

The database manager sorts data in a specific sequence, as per the SQL statement that you issue to request the data. Depending on the workload on the server, and if there is more data than the database manager can manage, the data (that is ordered in sequence) is allocated to temporary disk space. Data is allocated to temporary disk space when there is a large result set. The database manager dynamically manages the memory used when data is allocated to temporary disk space.

For example, expiration processing can produce a large result set. If there is not enough system memory on the database to store the result set, some of the data is allocated to temporary disk space. During expiration processing, if a node or file space are selected that are too large to process, the database manager does not have enough memory to sort the data.

To run database operations, consider adding more database space for the following scenarios:

- The database has a small amount of space and the server operation that requires temporary space uses the remaining free space.
- The file spaces are large, or the file spaces has a policy assigned to it which creates many file versions.
- The Tivoli Storage Manager server must run with limited memory. The database uses the Tivoli Storage Manager server main memory to run database operations. However, if there is insufficient memory available, the Tivoli Storage Manager server allocates temporary space on disk to the database. For example, if 10G of memory is available and database operations require 12G of memory, the database uses temporary space.
- An `out of database space` error is displayed when you deploy a Tivoli Storage Manager V6 server. Monitor the server activity log for messages related to database space.

Important: Do not change the DB2 software that is installed with the Tivoli Storage Manager installation packages and fix packs. Do not install or upgrade to a different version, release, or fix pack, of DB2 software to avoid damage to the

database.

Recovery log space requirements

In Tivoli Storage Manager, the term *recovery log* comprises the active log, the archive log, the active log mirror, and the archive failover log. The amount of space that you require for the recovery log depends on various factors, including, for example, the amount of client activity with the server.

Active and archive log space

When you estimate space requirements for active and archive logs, include some extra space for contingencies such as occasional heavy workloads and failovers.

In Tivoli Storage Manager servers V6.1 and later, the active log can be a maximum size of 128 GB. The archive log size is limited to the size of the file system that it is installed on.

Use the following general guidelines when you estimate the size of the active log:
- The suggested starting size for the active log is 16 GB.
- Ensure that the active log is at least large enough for the amount of concurrent activity that the server typically handles. As a precaution, try to anticipate the largest amount of work that the server manages at one time. Provision the active log with extra space that can be used if needed. Consider using 20% of extra space.
- Monitor used and available active log space. Adjust the size of the active log as needed, depending upon factors such as client activity and the level of server operations.
- Ensure that the directory that holds the active log is as large as, or larger than, the size of the active log. A directory that is larger than the active log can accommodate failovers, if they occur.
- Ensure that the file system that contains the active log directory has at least 8 GB of free space for temporary log movement requirements.

The suggested starting size for the archive log is 48 GB.

The archive log directory must be large enough to contain the log files that are generated since the previous full backup. For example, if you perform a full backup of the database every day, the archive log directory must be large enough to hold the log files for all the client activity that occurs during 24 hours. To recover space, the server deletes obsolete archive log files after a full backup of the database. If the archive log directory becomes full and a directory for archive failover logs does not exist, log files remain in the active log directory. This condition can cause the active log directory to fill up and stop the server. When the server restarts, some of the existing active-log space is released.

After the server is installed, you can monitor archive log utilization and the space in the archive log directory. If the space in the archive log directory fills up, it can cause the following problems:
- The server is unable to perform full database backups. Investigate and resolve this problem.
- Other applications write to the archive log directory, exhausting the space that is required by the archive log. Do not share archive log space with other applications including other Tivoli Storage Manager servers. Ensure that each server has a separate storage location that is owned and managed by that specific server.

For guidance about the layout and tuning of the active log and archive log, see Optimizing Performance.

Example: Estimating active and archive log sizes for basic client-store operations:

Basic client-store operations include backup, archive, and space management. Log space must be sufficient to handle all store transactions that are in progress at one time.

To determine the sizes of the active and archive logs for basic client-store operations, use the following calculation:

```
number of clients  x  files stored during each transaction
   x  log space needed for each file
```

This calculation is used in the example in the following table.

Table 11. Basic client-store operations

Item	Example values	Description
Maximum number of client nodes that back up, archive, or migrate files concurrently at any time	300	The number of client nodes that back up, archive, or migrate files every night.
Files stored during each transaction	4096	The default value of the server option TXNGROUPMAX is 4096.
Log space that is required for each file	3053 bytes	The value of 3053 bytes for each file in a transaction represents the log bytes that are needed when backing up files from a Windows client where the file names are 12 - 120 bytes. This value is based on the results of tests performed under laboratory conditions. The tests consisted of backup-archive clients performing backup operations to a random-access disk (DISK) storage pool. DISK pools result in more log use than sequential-access storage pools. Consider a value larger than 3053 bytes if the data being stored has file names that are longer than 12 - 120 bytes.

Active log: Suggested size	19.5 GB [1]	Use the following calculation to determine the size of the active log. One GB equals 1,073,741,824 bytes.
		
		`(300 clients x 4096 files stored during each transaction x 3053 bytes for each file) ÷ 1,073,741,824 bytes = 3.5 GB`
		
		Increase that amount by the suggested starting size of 16 GB:
		
		`3.5 + 16 = 19.5 GB`

Archive log: Suggested size	58.5 GB [1]	Because of the requirement to be able to store archive logs across three server database-backup cycles, multiply the estimate for the active log by 3 to estimate the total archive log requirement.
		
		`3.5 x 3 = 10.5 GB`
		
		Increase that amount by the suggested starting size of 48 GB:
		
		`10.5 + 48 = 58.5 GB`

Table 11. Basic client-store operations (continued)

Item	Example values	Description
[1] The example values in this table are used only to illustrate how the sizes for active logs and archive logs are calculated. In a production environment that does not use deduplication, 16 GB is the suggested minimum size for an active log. The suggested minimum size for an archive log in a production environment that does not use deduplication is 48 GB. If you substitute values from your environment and the results are larger than 16 GB and 48 GB, use your results to size the active log and archive log. Monitor your logs and adjust their size if necessary.		

Example: Estimating active and archive log sizes for clients that use multiple sessions:

If the client option RESOURCEUTILIZATION is set to a value that is greater than the default, the concurrent workload for the server increases.

To determine the sizes of the active and archive logs when clients use multiple sessions, use the following calculation:

```
number of clients  x  sessions for each client  x  files stored
   during each transaction  x  log space needed for each file
```

This calculation is used in the example in the following table.

Table 12. Multiple client sessions

Item	Example values		Description
Maximum number of client nodes that back up, archive, or migrate files concurrently at any time	300	1000	The number of client nodes that back up, archive, or migrate files every night.
Possible sessions for each client	3	3	The setting of the client option RESOURCEUTILIZATION is larger than the default. Each client session runs a maximum of three sessions in parallel.
Files stored during each transaction	4096	4096	The default value of the server option TXNGROUPMAX is 4096.
Log space that is required for each file	3053	3053	The value of 3053 bytes for each file in a transaction represents the log bytes needed when backing up files from a Windows client where the file names are 12 - 120 bytes. This value is based on the results of tests performed under laboratory conditions. Tests consisted of clients performing backup operations to a random-access disk (DISK) storage pool. DISK pools result in more log use than sequential-access storage pools. Consider a value larger than 3053 bytes if the data being stored has file names that are longer than 12 - 120 bytes.

Table 12. Multiple client sessions (continued)

Item	Example values		Description

Active log: Suggested size	26.5 GB [1]	51 GB [1]	The following calculation was used for 300 clients. One GB equals 1,073,741,824 bytes.
			
			`(300 clients x 3 sessions for each client x 4096 files stored during each transaction x 3053 bytes for each file) ÷ 1,073,741,824 = 10.5 GB`
			
			Increase that amount by the suggested starting size of 16 GB:
			
			`10.5 + 16 = 26.5 GB`
			
			The following calculation was used for 1000 clients. One GB equals 1,073,741,824 bytes.
			
			`(1000 clients x  3 sessions for each client x 4096 files store during each transaction x 3053 bytes for each file) ÷ 1,073,741,824 = 35 GB`
			
			Increase that amount by the suggested starting size of 16 GB:
			
			`35 + 16 = 51 GB`

Archive log: Suggested size	79.5 GB [1]	153 GB [1]	Because of the requirement to be able to store archive logs across three server-database backup cycles, the estimate for the active log is multiplied by 3:
			
			`10.5 x 3 = 31.5 GB`
			
			`35 x 3 = 105 GB`
			
			Increase those amounts by the suggested starting size of 48 GB:
			
			`31.5 + 48 = 79.5 GB`
			
			`105 + 48 = 153 GB`

[1] The example values in this table are used only to illustrate how the sizes for active logs and archive logs are calculated. In a production environment that does not use deduplication, 16 GB is the suggested minimum size for an active log. The suggested minimum size for an archive log in a production environment that does not use deduplication is 48 GB. If you substitute values from your environment and the results are larger than 16 GB and 48 GB, use your results to size the active log and archive log.

Monitor your active log and adjust its size if necessary.

Example: Estimating active and archive log sizes for simultaneous write operations:

If client backup operations use storage pools that are configured for simultaneous write, the amount of log space that is required for each file increases.

The log space that is required for each file increases by about 200 bytes for each copy storage pool that is used for a simultaneous write operation. In the example in the following table, data is stored to two copy storage pools in addition to a primary storage pool. The estimated log size increases by 400 bytes for each file. If you use the suggested value of 3053 bytes of log space for each file, the total number of required bytes is 3453.

This calculation is used in the example in the following table.

Table 13. Simultaneous write operations

Item	Example values	Description
Maximum number of client nodes that back up, archive, or migrate files concurrently at any time	300	The number of client nodes that back up, archive, or migrate files every night.
Files stored during each transaction	4096	The default value of the server option TXNGROUPMAX is 4096.
Log space that is required for each file	3453 bytes	3053 bytes plus 200 bytes for each copy storage pool. The value of 3053 bytes for each file in a transaction represents the log bytes that are needed when backing up files from a Windows client where the file names are 12 - 120 bytes. This value is based on the results of tests performed under laboratory conditions. The tests consisted of backup-archive clients performing backup operations to a random-access disk (DISK) storage pool. DISK pools result in more log use than sequential-access storage pools. Consider a value larger than 3053 bytes if the data being stored has file names that are longer than 12 - 120 bytes.

Active log: Suggested size	20 GB [1]	Use the following calculation to determine the size of the active log. One GB equals 1,073,741,824 bytes.
		
		`(300 clients x 4096 files stored during each transaction x 3453 bytes for each file) ÷ 1,073,741,824 bytes = 4.0 GB`
		
		Increase that amount by the suggested starting size of 16 GB:
		
		`4 + 16 = 20 GB`

Archive log: Suggested size	60 GB [1]	Because of the requirement to be able to store archive logs across three server database-backup cycles, multiply the estimate for the active log by 3 to estimate the archive log requirement:
		
		`4 GB  x  3  = 12 GB`
		
		Increase that amount by the suggested starting size of 48 GB:
		
		`12 + 48 = 60 GB`

[1] The example values in this table are used only to illustrate how the sizes for active logs and archive logs are calculated. In a production environment that does not use deduplication, 16 GB is the suggested minimum size for an active log. The suggested minimum size for an archive log in a production environment that does not use deduplication is 48 GB. If you substitute values from your environment and the results are larger than 16 GB and 48 GB, use your results to size the active log and archive log.

Monitor your logs and adjust their size if necessary.

Example: Estimating active and archive log sizes for basic client store operations and server operations:

Migration of data in server storage, identification processes for data deduplication, reclamation, and expiration might run concurrently with client store operations. Administrative tasks such as administrative commands or SQL queries from administrative clients can also run concurrently with client store operations. Server operations and administrative tasks that run concurrently can increase the active log space that is required.

For example, migration of files from the random-access (DISK) storage pool to a sequential-access disk (FILE) storage pool uses approximately 110 bytes of log space for each file that is migrated. For example, suppose that you have 300 backup-archive clients and each one of them backs up 100,000 files every night. The files are initially stored on DISK and then migrated to a FILE storage pool. To estimate the amount of active log space that is required for the data migration, use the following calculation. The number of clients in the calculation represents the maximum number of client nodes that back up, archive, or migrate files concurrently at any time.

```
300 clients  x 100,000 files for each client  x  110 bytes =  3.1 GB
```

Add this value to the estimate for the size of the active log that calculated for basic client store operations.

Example: Estimating active and archive log sizes under conditions of extreme variation:

Problems with running out of active log space can occur if you have many transactions that complete quickly and some transactions that take much longer to complete. A typical case occurs when many workstation or file-server backup sessions are active and a few very large database server-backup sessions are active. If this situation applies to your environment, you might need to increase the size of the active log so that the work completes successfully.

Example: Estimating archive log sizes with full database backups:

The Tivoli Storage Manager server deletes unnecessary files from the archive log only when a full database backup occurs. Consequently, when you estimate the space that is required for the archive log, you must also consider the frequency of full database backups.

For example, if a full database backup occurs once a week, the archive log space must be able to contain the information in the archive log for a full week.

The difference in archive log size for daily and full database backups is shown in the example in the following table.

Table 14. Full database backups

Item	Example values	Description
Maximum number of client nodes that back up, archive, or migrate files concurrently at any time	300	The number of client nodes that back up, archive, or migrate files every night.
Files stored during each transaction	4096	The default value of the server option TXNGROUPMAX is 4096.

Installing the Tivoli Storage Manager server

Table 14. Full database backups (continued)

Item	Example values	Description
Log space that is required for each file	3453 bytes	3053 bytes for each file plus 200 bytes for each copy storage pool. The value of 3053 bytes for each file in a transaction represents the log bytes needed when backing up files from a Windows client where the file names are 12 - 120 bytes. This value is based on the results of tests performed under laboratory conditions. Tests consisted of clients performing backup operations to a random-access disk (DISK) storage pool. DISK pools result in more log use than sequential-access storage pools. Consider a value larger than 3053 bytes if the data being stored has file names that are longer than 12 - 120 bytes.

Active log: Suggested size	20 GB [1]	Use the following calculation to determine the size of the active log. One GB equals 1,073,741,824 bytes.
		
		`(300 clients x 4096 files per transaction x 3453 bytes per file) ÷ 1,073,741,824 bytes = 4.0 GB`
		
		Increase that amount by the suggested starting size of 16 GB:
		
		`4 + 16 = 20 GB`

Archive log: Suggested size with a full database backup every day	60 GB [1]	Because of the requirement to be able to store archive logs across three backup cycles, multiply the estimate for the active log by 3 to estimate the total archive log requirement:
		
		`4 GB x 3 = 12 GB`
		
		Increase that amount by the suggested starting size of 48 GB:
		
		`12 + 48 = 60 GB`

Archive log: Suggested size with a full database every week	132 GB [1]	Because of the requirement to be able to store archive logs across three server database-backup cycles, multiply the estimate for the active log by 3 to estimate the total archive log requirement. Multiply the result by the number of days between full database backups:
		
		`(4 GB x 3 ) x 7 = 84 GB`
		
		Increase that amount by the suggested starting size of 48 GB:
		
		`84 + 48 = 132 GB`

[1] The example values in this table are used only to illustrate how the sizes for active logs and archive logs are calculated. In a production environment that does not use deduplication, 16 GB is the suggested minimum size for an active log. The suggested starting size for an archive log in a production environment that does not use deduplication is 48 GB. If you substitute values from your environment and the results are larger than 16 GB and 48 GB, use your results to size the active log and archive log.

Monitor your logs and adjust their size if necessary.

Example: Estimating active and archive log sizes for data deduplication operations:

If you deduplicate data, you must consider its effects on space requirements for active and archive logs.

The following factors affect requirements for active and archive log space:

The amount of deduplicated data

The effect of data deduplication on the active log and archive log space depends on the percentage of data that is eligible for deduplication. If the percentage of data that can be deduplicated is relatively high, more log space is required.

The size and number of extents

Approximately 1,500 bytes of active log space are required for each extent that is identified by a duplicate-identification process. For example, if 250,000 extents are identified by a duplicate-identification process, the estimated size of the active log is 358 MB:

```
250,000 extents identified during each process x 1,500 bytes
 for each extent = 358 MB
```

Consider the following scenario. Three hundred backup-archive clients back up 100,000 files each night. This activity creates a workload of 30,000,000 files. The average number of extents for each file is two. Therefore, the total number of extents is 60,000,000, and the space requirement for the archive log is 84 GB:

```
60,000,000 extents x 1,500 bytes for each extent = 84 GB
```

A duplicate-identification process operates on aggregates of files. An aggregate consists of files that are stored in a given transaction, as specified by the TXNGROUPMAX server option. Suppose that the TXNGROUPMAX server option is set to the default of 4096. If the average number of extents for each file is two, the total number of extents in each aggregate is 8192, and the space required for the active log is 12 MB:

```
8192 extents in each aggregate x 1500 bytes for each extent =
    12 MB
```

The timing and number of the duplicate-identification processes

The timing and number of duplicate-identification processes also affects the size of the active log. Using the 12 MB active-log size that was calculated in the preceding example, the concurrent load on the active log is 120 MB if 10 duplicate-identification processes are running in parallel:

```
12 MB for each process x 10 processes = 120 MB
```

File size

Large files that are processed for duplicate identification can also affect the size of the active log. For example, suppose that a backup-archive client backs up an 80 GB, file-system image. This object can have a high number of duplicate extents if, for example, the files included in the file system image were backed up incrementally. For example, assume that a file system image has 1.2 million duplicate extents. The 1.2 million extents in this large file represent a single transaction for a duplicate-identification process. The total space in the active log that is required for this single object is 1.7 GB:

```
1,200,000 extents x 1,500 bytes for each extent = 1.7 GB
```

Installing the Tivoli Storage Manager server

If other, smaller duplicate-identification processes occur at the same time as the duplicate-identification process for a single large object, the active log might not have enough space. For example, suppose that a storage pool is enabled for deduplication. The storage pool has a mixture of data, including many relatively small files that range from 10 KB to several hundred KB. The storage pool also has few large objects that have a high percentage of duplicate extents.

To take into account not only space requirements but also the timing and duration of concurrent transactions, increase the estimated size of the active log by a factor of two. For example, suppose that your calculations for space requirements are 25 GB (23.3 GB + 1.7 GB for deduplication of a large object). If deduplication processes are running concurrently, the suggested size of the active log is 50 GB. The suggested size of the archive log is 150 GB.

The examples in the following tables show calculations for active and archive logs. The example in the first table uses an average size of 700 KB for extents. The example in the second table uses an average size of 256 KB. As the examples show, the average deduplicate-extent size of 256 KB indicates a larger estimated size for the active log. To minimize or prevent operational problems for the server, use 256 KB to estimate the size of the active log in your production environment.

Table 15. Average duplicate-extent size of 700 KB

Item	Example values		Description
Size of largest single object to deduplicate	800 GB	4 TB	The granularity of processing for deduplication is at the file level. Therefore, the largest single file to deduplicate represents the largest transaction and a correspondingly large load on the active and archive logs.
Average size of extents	700 KB	700 KB	The deduplication algorithms use a variable block method. Not all deduplicated extents for a given file are the same size, so this calculation assumes an average size for extents.
Extents for a given file	1,198,372 bits	6,135,667 bits	Using the average extent size (700 KB), these calculations represent the total number of extents for a given object. The following calculation was used for an 800 GB object: `(800 GB ÷ 700 KB) = 1,198,372 bits` The following calculation was used for a 4 TB object: `(4 TB ÷ 700 KB) = 6,135,667 bits`
Active log: Suggested size that is required for the deduplication of a single large object during a single duplicate-identification process	1.7 GB	8.6 GB	The estimated active log space that are needed for this transaction.

Table 15. Average duplicate-extent size of 700 KB (continued)

Item	Example values		Description
Active log: Suggested total size	66 GB [1]	79.8 GB [1]	After considering other aspects of the workload on the server in addition to deduplication, multiply the existing estimate by a factor of two. In these examples, the active log space required to deduplicate a single large object is considered along with previous estimates for the required active log size. The following calculation was used for multiple transactions and an 800 GB object: `(23.3 GB + 1.7 GB) x 2 = 50 GB` Increase that amount by the suggested starting size of 16 GB: `50 + 16 = 66 GB` The following calculation was used for multiple transactions and a 4 TB object: `(23.3 GB + 8.6 GB) x 2 = 63.8 GB` Increase that amount by the suggested starting size of 16 GB: `63.8 + 16 = 79.8 GB`
Archive log: Suggested size	198 GB [1]	239.4 GB [1]	Multiply the estimated size of the active log by a factor of 3. The following calculation was used for multiple transactions and an 800 GB object: `50 GB x 3 = 150 GB` Increase that amount by the suggested starting size of 48 GB: `150 + 48 = 198 GB` The following calculation was used for multiple transactions and a 4 TB object: `63.8 GB x 3 = 191.4 GB` Increase that amount by the suggested starting size of 48 GB: `191.4 + 48 = 239.4 GB`

[1] The example values in this table are used only to illustrate how the sizes for active logs and archive logs are calculated. In a production environment that uses deduplication, 32 GB is the suggested minimum size for an active log. The suggested minimum size for an archive log in a production environment that uses deduplication is 96 GB. If you substitute values from your environment and the results are larger than 32 GB and 96 GB, use your results to size the active log and archive log.

Monitor your logs and adjust their size if necessary.

Table 16. Average duplicate-extent size of 256 KB

Item	Example values		Description
Size of largest single object to deduplicate	800 GB	4 TB	The granularity of processing for deduplication is at the file level. Therefore, the largest single file to deduplicate represents the largest transaction and a correspondingly large load on the active and archive logs.

Table 16. Average duplicate-extent size of 256 KB (continued)

Item	Example values		Description
Average size of extents	256 KB	256 KB	The deduplication algorithms use a variable block method. Not all deduplicated extents for a given file are the same size, so this calculation assumes an average extent size.

Extents for a given file	3,276,800 bits	16,777,216 bits	Using the average extent size, these calculations represent the total number of extents for a given object.
			
			The following calculation was used for multiple transactions and an 800 GB object:
			
			`(800 GB ÷ 256 KB) = 3,276,800 bits`
			
			The following calculation was used for multiple transactions and a 4 TB object:
			
			`(4 TB ÷ 256 KB) = 16,777,216 bits`

Active log: Suggested size that is required for the deduplication of a single large object during a single duplicate-identification process	4.5 GB	23.4 GB	The estimated size of the active log space that is required for this transaction.

Active log: Suggested total size	71.6 GB [1]	109.4 GB [1]	After considering other aspects of the workload on the server in addition to deduplication, multiply the existing estimate by a factor of 2. In these examples, the active log space required to deduplicate a single large object is considered along with previous estimates for the required active log size.
			
			The following calculation was used for multiple transactions and an 800 GB object:
			
			`(23.3 GB + 4.5 GB) x 2 = 55.6 GB`
			
			Increase that amount by the suggested starting size of 16 GB:
			
			`55.6 + 16 = 71.6 GB`
			
			The following calculation was used for multiple transactions and a 4 TB object:
			
			`(23.3 GB + 23.4 GB) x 2 = 93.4 GB`
			
			Increase that amount by the suggested starting size of 16 GB:
			
			`93.4 + 16 = 109.4 GB`

Table 16. Average duplicate-extent size of 256 KB (continued)

Item	Example values		Description
Archive log: Suggested size	214.8 GB [1]	328.2 GB [1]	The estimated size of the active log multiplied by a factor of 3. The following calculation was used for an 800 GB object: `55.6 GB x 3 = 166.8 GB` Increase that amount by the suggested starting size of 48 GB: `166.8 + 48 = 214.8 GB` The following calculation was used for a 4 TB object: `93.4 GB x 3 = 280.2 GB` Increase that amount by the suggested starting size of 48 GB: `280.2 + 48 = 328.2 GB`
[1] The example values in this table are used only to illustrate how the sizes for active logs and archive logs are calculated. In a production environment that uses deduplication, 32 GB is the suggested minimum size for an active log. The suggested minimum size for an archive log in a production environment that uses deduplication is 96 GB. If you substitute values from your environment and the results are larger than 32 GB and 96 GB, use your results to size the active log and archive log. Monitor your logs and adjust their size if necessary.			

Active-log mirror space

The active log can be mirrored so that the mirrored copy can be used if the active log files cannot be read. There can be only one active log mirror.

Creating a log mirror is a suggested option. If you increase the size of the active log, the log mirror size is increased automatically. Mirroring the log can affect performance because of the doubled I/O activity that is required to maintain the mirror. The additional space that the log mirror requires is another factor to consider when deciding whether to create a log mirror.

If the mirror log directory becomes full, the server issues error messages to the activity log and to the `db2diag.log`. Server activity continues.

Archive-failover log space

The archive failover log is used by the server if the archive log directory runs out of space.

Specifying an archive failover log directory can prevent problems that occur if the archive log runs out of space. If both the archive log directory and the drive or file system where the archive failover log directory is located become full, the data remains in the active log directory. This condition can cause the active log to fill up, which causes the server to halt.

Server naming best practices

Use these descriptions as a reference when you install or upgrade a Tivoli Storage Manager server.

Instance user ID

The instance user ID is used as the basis for other names related to the server instance. The instance user ID is also called the instance owner.

For example: tsminst1

The instance user ID is the user ID that must have ownership or read/write access authority to all directories that you create for the database and the recovery log. The standard way to run the server is under the instance user ID. That user ID must also have read/write access to the directories that are used for any **FILE** device classes.

Home directory for the instance user ID

The home directory can be created when creating the instance user ID, by using the option (-m) to create a home directory if it does not exist already. Depending on local settings, the home directory might have the form: /home/*instance_user_ID*

For example: /home/tsminst1

The home directory is primarily used to contain the profile for the user ID and for security settings.

Database instance name

The database instance name must be the same as the instance user ID under which you run the server instance.

For example: tsminst1

Instance directory

The instance directory is a directory that contains files specifically for a server instance (the server options file and other server-specific files). It can have any name that you want. For easier identification, use a name that ties the directory to the instance name.

You can create the instance directory as a subdirectory of the home directory for the instance user ID. For example: /home/*instance_user_ID*/*instance_user_ID*

The following example places the instance directory in the home directory for user ID tsminst1: /home/tsminst1/tsminst1

You can also create the directory in another location, for example: /tsmserver/tsminst1

The instance directory stores the following files for the server instance:
- The server options file, dsmserv.opt
- The server key database file, cert.kdb, and the .arm files (used by clients and other servers to import the Secure Sockets Layer certificates of the server)

- Device configuration file, if the DEVCONFIG server option does not specify a fully qualified name
- Volume history file, if the VOLUMEHISTORY server option does not specify a fully qualified name
- Volumes for **DEVTYPE=FILE** storage pools, if the directory for the device class is not fully specified, or not fully qualified
- User exits
- Trace output (if not fully qualified)

Database name

The database name is always TSMDB1, for every server instance. This name cannot be changed.

Server name

The server name is an internal name for Tivoli Storage Manager, and is used for operations that involve communication among multiple Tivoli Storage Manager servers. Examples include server-to-server communication and library sharing.

The server name is also used when you add the server to the Administration Center so that it can be managed using that interface. Use a unique name for each server. For easy identification in the Administration Center (or from a **QUERY SERVER** command), use a name that reflects the location or purpose of the server.

If you use the wizard, the default name that is suggested is the host name of the system that you are using. You can use a different name that is meaningful in your environment. If you have more than one server on the system and you use the wizard, you can use the default name for only one of the servers. You must enter a unique name for each server.

For example:

```
PAYROLL
SALES
```

For more information about server names, see the *Administrator's Guide*.

Directories for database space and recovery log

The directories can be named according to local practices. For easier identification, consider using names that tie the directories to the server instance.

For example, for the archive log:
```
/tsminst1_archlog
```

Installation directories

Installation directories for the Tivoli Storage Manager server include the server, DB2, device, language, and other directories. Each one contains several additional directories.

The default directories and their subdirectories are listed here for the server, DB2, devices, and languages:

- **Server directory** (`/opt/tivoli/tsm/server/bin`), which contains:
  - Server code and licensing
- **Additional server directories**:
  - The command and message help are in the `/opt/tivoli/tsm/server/bin/dsmserv.hlp` directory.
  - Tivoli inventory (`/opt/tivoli/tsm/tivinv`)
- **DB2 directories**

  The DB2 product that is installed as part of the installation of the Tivoli Storage Manager server has the directory structure as documented in DB2 information sources. Protect these directories and files as you do the server directories.
  - `/opt/tivoli/tsm/db2`
- **Device directories**
  - `/usr/kernel/drv/`
  - `/usr/kernel/drv/sparcv9` for SPARC architecture
- **Language directory**

  Language-dependent portions of the program are located here:

  `/opt/tivoli/tsm/server/bin`

  You can use US English, German, French, Italian, Spanish, Brazilian Portuguese, Korean, Japanese, traditional Chinese, simplified Chinese, Chinese GBK, Chinese Big5, and Russian.

Chapter 2. Installing the Tivoli Storage Manager server components

To install the Tivoli Storage Manager 6.3 or later server, you can use the graphical installation wizard, the console wizard, or the command line in silent mode.

Planning to install	➡	Installing components	➡	Taking the first steps
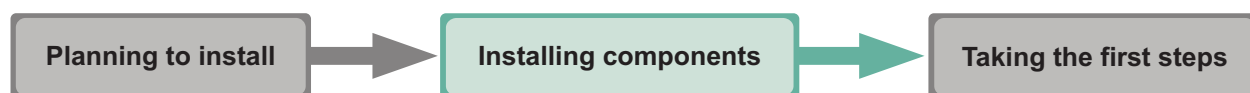
Using the Tivoli Storage Manager installation software, you can install the following components:

- Tivoli Storage Manager Server

  Tip: The Tivoli Storage Manager client application programming interface (API), the database (DB2), and the Global Security Kit (GSKit) are automatically installed when you select the server component.
- Tivoli Storage Manager Server Languages
- Tivoli Storage Manager License
- Tivoli Storage Manager Devices
- Tivoli Storage Manager Storage Agent

  See the *Storage Agent User's Guide* for more details about storage agents.

Important: Use your root user ID to install Tivoli Storage Manager. If you do not, certain key Tivoli Storage Manager functions do not work properly.

1. If you are installing the products using the Tivoli Storage Manager DVD, complete the following steps:

   Insert the Tivoli Storage Manager DVD into a DVD drive. Ensure that the DVD is mounted on directory /dvdrom and change to that directory.

2. If you downloaded the program from Passport Advantage as an executable file, complete the following steps.

   a. Verify that you have enough space to store the installation files when they are extracted from the product package. See the download document for the space requirements:
      - Tivoli Storage Manager: http://www.ibm.com/support/docview.wss?uid=swg24030521
      - Tivoli Storage Manager Extended Edition: http://www.ibm.com/support/docview.wss?uid=swg24030527
      - System Storage Archive Manager: http://www.ibm.com/support/docview.wss?uid=swg24030530

   b. Change to the directory where you downloaded the package file. Be sure to extract the installation files to an empty directory. Do not extract to a directory that contains previously extracted files, or any other files.

Also, ensure that you extract the Tivoli Storage Manager installation wizard to a directory where the root user ID and instance user ID have executable permission.

c. Change the file permissions by entering the following command:

```
chmod a+x package_name.bin
```

The *package_name* is typically a name such as CZ1N1ML.

d. Extract the installation files:

```
./package_name.bin
```

The package is large, so the extraction takes some time.

3. Optional: After all the files are extracted, locate this file and run it to ensure that your system meets all requirements:

prereqcheck.bin

See "Running the installation prerequisite checker" on page 7 for details.

4. Ensure that the /etc/hosts file is configured. See "Configuring the /etc/hosts file" for details.

5. Ensure that the following command is enabled so that the Tivoli Storage Manager wizards work properly:

logins

By default, the command is enabled.

6. Select one of the following ways of installing Tivoli Storage Manager:

Installation wizard
"Installing Tivoli Storage Manager by using the installation wizard" on page 31

Command-line console wizard
"Installing Tivoli Storage Manager by using the console installation wizard" on page 32

Silent mode
"Installing Tivoli Storage Manager in silent mode" on page 33

7. After you install Tivoli Storage Manager and before you customize it for your use, go to the Tivoli Storage Manager website: http://www.ibm.com/support/entry/portal/Overview/Software/Tivoli/Tivoli_Storage_Manager. Click **Support and downloads** and apply any applicable fixes.

Configuring the /etc/hosts file

The /etc/hosts file must have the correct format before you start the Tivoli Storage Manager installation.

Ensure that the /etc/hosts file meets the following requirements:

1. Locate the /etc/hosts file on your system. Open it with an editor, and as a root user if you plan on editing it.

2. Ensure that the following lines were not removed. Replace them if they are missing:

```
127.0.0.1    localhost
359.33.9.234 your.server.name
workstation
```

where you replace 359.33.9.234 with the IP address of your system and change your.server.name to the fully qualified host name for your system. Include the name of your workstation after the full qualified host name.

3. Save the host file.

Installing Tivoli Storage Manager by using the installation wizard

Using the installation wizard is one method of installing Tivoli Storage Manager.

To install Tivoli Storage Manager by using the installation wizard, complete the following steps:

1. Verify that the operating system is set to the language that you require. By default, the language of the operating system is the language of the installation wizard.

   If you plan to select a different language for the wizard, you might have to change the language of the operating system. By setting the operating system to an ASCII language, such as English or Spanish, you can select an ASCII language for the wizard later in the installation process. By setting the operating system to a non-ASCII language, such as Simplified Chinese, you can select a non-ASCII language later in the installation process.

   For information about setting the language of the operating system, see the operating system documentation.

2. If you are installing locally onto a remote system that uses an X display, and your local system does not have an X Window System server running, the installation might fail. If it fails, ensure that the DISPLAY environment variable is *not* set and restart the installation.

3. If your temporary location is smaller than Tivoli Storage Manager needs, as per the system requirements, use the Install Anywhere environment variable $IATEMPDIR as the temporary directory.

4. Before installing any Tivoli Storage Manager components, ensure that the LD_LIBRARY_PATH_64 environment variable is *not* set.

5. To start the wizard without saving your responses, enter the following command:

   ./install.bin

   To start the wizard and save your responses to later use for a silent installation, enter the following command and specify the -r option.

   ./install.bin -r /*path_name*/response.rsp

   where *path_name* is the full directory path to where you want the response file to be created. If you do not specify a fully qualified name, the response file is placed in a temporary directory.

6. Select the language for your installation and follow the wizard, selecting **Next** to step through the wizard.

   Select the product that you are entitled to use and a license agreement is displayed. You can select only one product on the page. If you select Tivoli Storage Manager, Tivoli Storage Manager Extended Edition, or System Storage Archive Manager, you are asked if you will be using LAN-free or library sharing. If you select **YES**, you must accept the Tivoli Storage Manager for Storage Area Networks license agreement. This is in addition to the license for the product that you chose on the previous page.

   Select the components that you want to install. Components include the server, languages, license, device driver, and storage agent. There is no default, so you must make a selection. If you previously installed a server, ensure that you

select the same directory when you install a language package, license, or device driver. If you previously installed a storage agent, ensure that you select the same directory if you return to install a device driver.

A server and a storage agent cannot be installed on the same workstation.

The Tivoli Storage Manager client application programming interface (API), DB2 Version 9.7, and IBM Global Security Kit (GSKit) Version 8 are automatically installed when you select the server component.

If there were any errors during the installation, the summary page lists the errors and directs you to an error log file. The log is in the following directory:

```
/var/tivoli/tsm
```

After you install a new Tivoli Storage Manager server, you must configure it. See Chapter 3, "Taking the first steps after you install Tivoli Storage Manager," on page 41.

Installing Tivoli Storage Manager by using the console installation wizard

Using the console installation wizard is one method of installing Tivoli Storage Manager.

To install Tivoli Storage Manager by using the console installation wizard, complete these steps:

1. Verify that the operating system is set to the language that you require. By default, the language of the operating system is the language of the installation wizard.

   If you plan to select a different language for the wizard, you might have to change the language of the operating system. By setting the operating system to an ASCII language, such as English or Spanish, you can select an ASCII language for the wizard later in the installation process. By setting the operating system to a non-ASCII language, such as Simplified Chinese, you can select a non-ASCII language later in the installation process.

   For information about setting the language of the operating system, see the operating system documentation.

2. If you are installing locally onto a remote system that uses an X display, and your local system does not have an X Window System server running, the installation might fail. If it fails, ensure that the DISPLAY environment variable is *not* set and restart the installation.

3. If your temporary location is smaller than Tivoli Storage Manager needs, as per the system requirements, use the Install Anywhere environment variable `$IATEMPDIR` as the temporary directory.

4. Before installing any Tivoli Storage Manager components, ensure that the `LD_LIBRARY_PATH_64` environment variable is *not* set.

5. To start the wizard without saving your responses, enter the following command:

   ```
   ./install.bin -i console
   ```

   To start the wizard and save your responses, enter the following command and specify the -r option.

   ```
   ./install.bin -i console -r /path_name/response.rsp
   ```

where *path_name* is the full directory path to where you want the response file to be created. If you do not specify a fully qualified name, the response file is placed in a temporary directory.

The Tivoli Storage Manager installation wizard starts.

6. Select the language for your installation and follow the wizard, selecting **Next** to step through the wizard.

   Select the product that you are entitled to use and a license agreement is displayed. You can select only one product on the page. If you select Tivoli Storage Manager, Tivoli Storage Manager Extended Edition, or System Storage Archive Manager, you are asked if you will be using LAN-free or library sharing. If you select **YES**, you must accept the Tivoli Storage Manager for Storage Area Networks license agreement. This is in addition to the license for the product that you chose on the previous page.

   Select the components that you want to install. Components include the server, languages, license, device driver, and storage agent. There is no default, so you must make a selection. If you previously installed a server, ensure that you select the same directory when you install a language package, license, or device driver. If you previously installed a storage agent, ensure that you select the same directory if you return to install a device driver.

   A server and a storage agent cannot be installed on the same workstation.

   The Tivoli Storage Manager client application programming interface (API), DB2 Version 9.7, and IBM Global Security Kit (GSKit) Version 8 are automatically installed when you select the server component.

If there were any errors during the installation, the summary page lists the errors and directs you to an error log file. The log is in the following directory:

```
/var/tivoli/tsm
```

After you install a new Tivoli Storage Manager server, you must configure it. See Chapter 3, "Taking the first steps after you install Tivoli Storage Manager," on page 41.

Installing Tivoli Storage Manager in silent mode

Using silent mode is one method of installing Tivoli Storage Manager.

Pass the variables in Table 17 into this file to define the silent installation:

```
./install.bin
```

Table 17. Variables for the silent installation

Variable	Description
• -DIBM_TSM_LICENSE_ACCEPTED=true • -DIBM_TSMEE_LICENSE_ACCEPTED=true • -DIBM_SSAM_LICENSE_ACCEPTED=true • -DIBM_TSMSAN_LICENSE_ACCEPTED=true (required)	Specify one or two variables or the installation stops. It also stops if you specify more than two variables. The wizard installs the license agreement for the Tivoli Storage Manager product that is selected. **Tip:** If two products are specified, the wizard checks that one of them is the Tivoli Storage Manager for Storage Area Networks license: IBM_TSMSAN_LICENSE_ACCEPTED=true. If one variable is not, the wizard stops.

Table 17. Variables for the silent installation (continued)

Variable	Description
For command line: -DINSTANCE_CRED="*instance1 userid1 password1, instance2 userid2 password2*" (required for reinstallation only) For response file: INSTANCE_CRED=*instance1 userid1 password1, instance2 userid2 password2* (required for reinstallation only)	Enter the instance credentials used by the installation wizard to redefine the database instance. Use quotation marks around the credentials when you pass them into the command line. Specify multiple instances by separating them with a comma. **Tip:** An instance cannot be in both the INSTANCE_CRED and the INSTANCE_OMIT parameters. All of the instances that exist when an installation package is reinstalled must be listed in either the INSTANCE_CRED or the INSTANCE_OMIT parameters. Or, the silent installation fails.
For command line:- DINSTANCE_OMIT="*instance3, instance4*" (optional for reinstallation only) For response file: INSTANCE_OMIT=*instance3, instance4* (optional for reinstallation only)	Enter any instances that will not be recreated as part of the installation. Use this variable if you have an instance that exists but is not used. Use it if you have removed the instance user ID, forgotten the password, or otherwise do not want to create the instance as part of a reinstallation. Use quotation marks around the credentials when you pass them into the command line. Specify multiple instances by separating them with a comma. **Tip:** An instance cannot be in both the INSTANCE_CRED and the INSTANCE_OMIT parameters. All of the instances that exist when an installation package is reinstalled must be listed in either the INSTANCE_CRED or the INSTANCE_OMIT parameters. Or, the silent installation fails.
-DINSTALL_DEVICES=1 (optional)	Install the Tivoli Storage Manager device driver.
-DINSTALL_LICENSE=1 (required for base packages)	Install the Tivoli Storage Manager server license component. This variable should be specified only if the package being installed includes Tivoli Storage Manager server license files or the installation might fail. This option is typically required only for a first-time installation of the base release package. This option should not be used when installing most fix packs and interim fix packages because they do not include the server licenses.
-DINSTALL_SERVER=1 (optional)	Install the Tivoli Storage Manager server component.
-DINSTALL_STAGENT=1 (optional)	Install the Tivoli Storage Manager storage agent.

Table 17. Variables for the silent installation (continued)

Variable	Description
-DINSTALL_*language_package*=1 (optional)	Install a specific language package. You can install the following server language-packages during the silent installation, using these variables: • INSTALL_GERMAN • INSTALL_SPANISH • INSTALL_FRENCH • INSTALL_ITALIAN • INSTALL_BRPORTUGUESE • INSTALL_KOREAN • INSTALL_JAPANESE • INSTALL_RUSSIAN • INSTALL_SCHINESE • INSTALL_TCHINESE • INSTALL_ENGLISHUTF8 • INSTALL_GERMANUTF8 • INSTALL_SPANISHUTF8 • INSTALL_FRENCHUTF8 • INSTALL_ITALIANUTF8 • INSTALL_PTBUTF8 • INSTALL_KOREANUTF8 • INSTALL_JAPANESEUTF8 • INSTALL_SCHINESEUTF8 • INSTALL_RUSSIANUTF8 • INSTALL_TCHINESEUTF8 • INSTALL_BIG5CH For example, to install the German language package, use this variable: -DINSTALL_GERMAN=1

• To enable a component during silent installation, append it to the **install.bin** command on a single line. For example:

```
./install.bin -i silent
-DIBM_TSM_LICENSE_ACCEPTED=true
-DINSTALL_SERVER=1 -DINSTALL_LICENSE=1
-DINSTALL_ENGLISHUTF8=1
```

Or, for a reinstallation:

```
./install.bin -i silent -DINSTANCE_CRED="tsminst1 tsminst1 tsminst1"
-DINSTANCE_OMIT="tsminst2"
-DIBM_TSM_LICENSE_ACCEPTED=true -DINSTALL_SERVER=1
```

• Alternatively, the component variables can be placed into a response file. The path to this response file can then be passed into the ./install.bin command. To create this file, use the same variables that are in Table 17 on page 33.

Remove the -D and separate the options on individual lines. Do not use quotation marks. For example:

```
                   INSTANCE_CRED=tsminst1 tsminst1 tsminst1
                   INSTANCE_OMIT=tsminst2
                   IBM_product_LICENSE_ACCEPTED=true
                   INSTALL_SERVER=1
                   INSTALL_SPANISH=1
```

- To use an existing response file, issue the following command:

  `./install.bin -i silent -f response_file`

  where the *response_file* is the full directory path to a file that you created in the Tivoli Storage Manager installation process. The response file contains variables that you selected during a prior installation, by using the GUI or console wizard. You might see a difference between response files, depending on which installation mode you used (GUI or console).

  Remember: If you previously installed a server, ensure that you select the same directory when you install a language package, license, or device driver. If you previously installed a storage agent, ensure that you select the same directory if you return to install a device driver.

  Fix any errors before continuing. See the following log for more information:

  ```
  /var/tivoli/tsm
  ```

  After you install a new Tivoli Storage Manager server, you must configure it. See Chapter 3, "Taking the first steps after you install Tivoli Storage Manager," on page 41.

Using Solaris zones

The Tivoli Storage Manager server supports the Solaris Zone feature available with Solaris Version 10. There are two different types of supported zones: global and local.

The global zone is the default zone on a Solaris host system and controls system resources. Local zones can be created and controlled from the global zone, and they run processes in isolation on the same host system.

To install the Tivoli Storage Manager server to either the global zone or a local zone, log in to the zone you want to install the server to. Then, complete the normal installation process for your system. You can install the server to more than one zone by completing each installation separately. The Tivoli Storage Manager server is installed only to the current zone.

See the chapter on using devices in the *Administrator's Guide* for information about installing the Tivoli Storage Manager device driver to a Solaris zone.

For more information, see your Solaris system administration documentation.

Creating a Solaris zone

To install a Tivoli Storage Manager server to a Solaris zone, the zone must have write access to the /usr, /opt, /var, and /tmp directories. A default zone does not have write access to the /usr directory.

The Tivoli Storage Manager server installation process requires a Solaris local zone to have write permissions for the /usr, /opt, /var and /tmp directories when creating the local zone from the global zone. By default, a local zone has write permission to /opt, /var and /tmp directories but it does not have a write permission for the /usr directory. In order to install Tivoli Storage Manager Version 6.3 or later to a local zone on the Solaris platform, the zone must be configured with write access to the /usr directory.

To create a basic local zone with write access to the /usr directory, complete the following procedure.

1. From the global zone, create a zone directory:

   ```
   # mkdir -m 700 /zones/sunshade1
   ```

2. Configure the zone:

   ```
   # zonecfg -z sunshade1
   ```

   ```
   sunshade1: No such zone configured
   Use 'create' to begin configuring a new zone.
   zonecfg:sunshade1> create
   zonecfg:sunshade1> set zonepath=/zones/sunshade1
   zonecfg:sunshade1> set autoboot=true
   zonecfg:sunshade1> remove inherit-pkg-dir dir=/usr
   zonecfg:sunshade1> add net
   zonecfg:sunshade1:net> set address=9.11.100.1
   zonecfg:sunshade1:net> set physical=bnx0
   zonecfg:sunshade1:net> end
   zonecfg:sunshade1> add attr
   zonecfg:sunshade1:net> set name=comment
   zonecfg:sunshade1:net> set type=string
   zonecfg:sunshade1:net> set value="This is sunshade1..."
   zonecfg:sunshade1:net> end
   zonecfg:sunshade1> verify
   zonecfg:sunshade1> commit
   zonecfg:sunshade1>exit
   ```

3. Verify the zone:

   ```
   # zoneadm list -cv
   ```

   ```
     ID NAME          STATUS   PATH               BRAND    IP
      0 global          running  /                  native   shared
      - sunshade1       configured /zones/sunshade1   native   shared
   ```

   ```
   # zonecfg -z sunshade1 info
   ```

```
zonename: sunshade1
zonepath: /zones/sunshade1
brand: native
autoboot: false
bootargs:
pool:
limitpriv:
scheduling-class:
ip-type: shared
inherit-pkg-dir:
        dir: /lib
inherit-pkg-dir:
        dir: /platform
inherit-pkg-dir:
        dir: /sbin
net:
        address: 9.11.100.1
        physical: bnx0
attr:
        name: comment
        type: string
        value: "This is sunshade1..."
```

4. Install the zone:

   ```
   # zoneadm -z sunshade1 install
   ```

5. Start the zone:

   ```
   # zoneadm -z sunshade1 boot
   ```

   ```
   # zoneadm list -cv
   ```

   ```
   ID NAME           STATUS    PATH                 BRAND    IP
    0 global         running   /                    native   shared
    - sunshade1      configured /zones/sunshade1    native   shared
   ```

6. Configure the zone for the network:

   ```
   # zlogin -C sunshade1 # -- configure zone for the network
   ```

   After a local zone is created for Tivoli Storage Manager Version 6.3 or later, the
   Tivoli Storage Manager server, storage agent, and device driver packages can be
   installed to the zone. You can install and run the server, storage agent, and device
   driver in local zones by using the same process to install and run them in global
   zones.

Installing server language packages

Translations for the IBM Tivoli Storage Manager server allow the server to display
messages and help in languages other than U.S. English. The translations also
allow for the use of locale conventions for date, time, and number formatting.

Server language locales

Use either the default language package option or select another language package
to display server messages and help.

This language package is automatically installed for the following default language
option for Tivoli Storage Manager server messages and help:

- LANGUAGE AMENG

  The following system locale must be installed on the system when you use
  LANGUAGE AMENG:

    en_US

For languages or locales other than the default, install the language package that your installation requires.

You can use the languages shown:

Table 18. Server languages for Solaris

Language	LANGUAGE option value
Chinese, Simplified	zh
	zh_CN.UTF-8
Chinese, Traditional	zh_TW
	zh_TW.BIG5
	zh_TW.UTF-8
English	AMENG (default)
	en_US.UTF-8
French	fr_FR.ISO8859-1
	fr_FR.UTF-8
German	de_DE.ISO8859-1
	de_DE.UTF-8
Italian	it_IT.ISO8859-1
	it_IT.UTF-8
Japanese	ja
	ja_JP.UTF-8
Korean	ko
	ko_KR.UTF-8
Portuguese, Brazilian	pt_BR.ISO8859-1
	pt_BR.UTF-8
Russian	ru_RU.ISO8859-5
	ru_RU.UTF-8
Spanish	es_ES.ISO8859-1
	es_ES.UTF-8

Notes:
- LANGUAGE AMENG requires system locale en_US.
- For more information about setting the LANGUAGE option, see the *Administrator's Reference*.

Restriction: For Administration Center users, some characters might not be displayed properly if the web browser version is not the same language as the server. If this problem occurs, use a browser version that uses the same language as the server.

Configuring a language package

After you configure a language package, messages and help are shown on the Tivoli Storage Manager in languages other than US English. Installation packages are provided with Tivoli Storage Manager.

To set support for a certain locale, complete one of the following tasks:

- Set the `LANGUAGE` option in the server options file to the name of the locale that you want to use. For example:

  To use the `it_IT.IS08859-1` locale, set the `LANGUAGE` option to `it_IT.IS08859-1`. See "Server language locales" on page 38.

- Set the `LC_MESSAGES` environment variable to match the value that is set in the server options file. For example, to set the environment variable for Italian, enter the following value:

  `export LC_MESSAGES=it_IT`

If the locale is successfully initialized, it formats the date, time, and number for the server. If the locale is not successfully initialized, the server uses the US English message files and the date, time, and number format.

Chapter 3. Taking the first steps after you install Tivoli Storage Manager

After you install Tivoli Storage Manager Version 6.3 or later, prepare for the configuration. Using the configuration wizard is the preferred method of configuring the Tivoli Storage Manager instance.
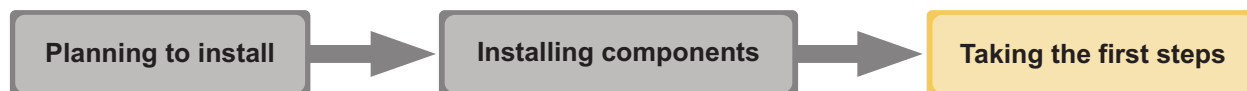

Figure 3. You are in the configuring the Tivoli Storage Manager server section

Configure the Tivoli Storage Manager server instance by completing the following steps:

1. Update the kernel parameter values.

   See "Tuning kernel parameters" on page 42.

2. Create the directories and user ID for the server instance. See "Creating the user ID and directories for the server instance" on page 43.

3. Configure a Tivoli Storage Manager instance. Select one of the following options:
   - Use the Tivoli Storage Manager configuration wizard, the preferred method. See "Configuring Tivoli Storage Manager using the configuration wizard" on page 45.
   - Use the Tivoli Storage Manager configuration wizard in the Administration Center. See "Configuring Tivoli Storage Manager using the Administration Center" on page 48.
   - Manually configure the new Tivoli Storage Manager instance. See "Configuring the server instance manually" on page 49. Complete the following steps during a manual configuration.
     a. Set up your directories and create the Tivoli Storage Manager instance. See "Creating the server instance" on page 50.
     b. Create a new server options file by copying the sample file to set up communications between the server and clients. See "Configuring server and client communications" on page 51.
     c. Issue the DSMSERV FORMAT command to format the database. See "Formatting the database and log" on page 55.
     d. Configure your system for database backup. See "Preparing the database manager for backup" on page 46.

4. Configure options to control when database reorganization runs. See "Configuring server options for server database maintenance" on page 58.

5. Configure access rights to deployment engine files. See "Configuring access rights to deployment engine files" on page 59

6. Start the Tivoli Storage Manager server instance if it is not already started.

   See "Starting the server instance on AIX, HP-UX, Linux, and Solaris systems" on page 59.

7. Register your license. See "Registering licenses" on page 63.

8. Prepare your system for database backups. See "Preparing the system for backups" on page 63.
9. Monitor the server. See "Monitoring the server" on page 64.

Tuning kernel parameters

For IBM Tivoli Storage Manager and DB2 to install and operate correctly on Oracle Solaris, you must update the kernel configuration parameters.

If you do not update these parameters, the installation of DB2 and Tivoli Storage Manager might fail. Even if installation is successful, operational problems might occur if you do not set parameter values.

Using the db2osconf utility

Use the **db2osconf** utility to get preferred changes based on the size of your system. The utility checks the settings of the kernel configuration parameters and suggests updates to improve performance.

The **db2osconf** utility does not change the settings in the /etc/system file. You must run the **db2osconf** utility after installing Tivoli Storage Manager. If you update a kernel parameter, you must restart the system.

The suggested updates provided by the **db2osconf** utility are the minimum settings required to run DB2 on your system. In addition to the suggestions made by the **db2osconf** utility, other changes are required to run both Tivoli Storage Manager and DB2.

To display a list of options for the **db2osconf** utility, issue the following command:

```
db2osconf -h
```

For Solaris 9 systems, edit the /etc/system file to update kernel parameters. For Solaris 10 systems, use **PROJMOD** commands to update the kernel parameters.

For details about the **db2osconf** utility, go to the DB2 information center: http://pic.dhe.ibm.com/infocenter/db2luw/v9r7. Search for **db2osconf**

.

Suggested minimum values

Ensure that the values for kernel parameters are sufficient to prevent operational problems from occurring when running the Tivoli Storage Manager server.

Table 19 shows the suggested minimum values for running Tivoli Storage Manager and DB2 on Solaris 9. Table 20 on page 43 shows the suggested minimum values for running Tivoli Storage Manager and DB2 on Solaris 10.

Table 19. Solaris 9 parameter values

Parameter	Description	Preferred value
set semsys:seminfo_semume	The process-wide maximum number of undo structures per process	5120
set semsys:seminfo_semmni	The number of semaphore identifiers	6144
set shmsys:shminfo_shmmax	The maximum shared-memory segment size	46,369,367,654
set shmsys:shminfo_shmmni	The minimum shared-memory segment size	6144

Table 19. Solaris 9 parameter values (continued)

Parameter	Description	Preferred value
set rlim_fd_max	The process open-file descriptors limit	65,536
set rlim_fd_cur	The file descriptor limit	4096

Table 20. Solaris 10 parameter values

Parameter	Description	Preferred value
`projmod -a -K "project.max-shm-memory=(privileged,46369367654,deny)" user.`*`process_owner`*	See note. The total amount of shared memory that is allowed for a project	46,369,367,654
`projmod -a -K "project.max-shm-ids=(privileged,6144,deny)" user.`*`process_owner`*	See note. The maximum shared memory IDs for a project	6144
`projmod -a -K "project.max-msg-ids=(privileged,5120,deny)" user.`*`process_owner`*	See note. The maximum message queue IDs for a project	5120
`projmod -a -K "project.max-sem-ids=(privileged,6144,deny)" user.`*`process_owner`*	See note. The maximum semaphore IDs for a project	6144
Note: To obtain information about project settings for a process owner on Solaris 10, issue the `project -l` command or check the /etc/project file. If a project does not exist, issue the following command to add a project: `projadd -U `*`process_owner`*` user.`*`process_owner`* To specify a project name for the commands that are listed in the table, be sure to add the prefix `user.` to the name of the process owner.		

Creating the user ID and directories for the server instance

Create the user ID for the Tivoli Storage Manager server instance and create the directories that the Tivoli Storage Manager server instance needs for database and recovery logs.

Review the information about planning space for the server before completing this task. See "Worksheets for planning details for the Tivoli Storage Manager server" on page 9.

1. Create the user ID that will own the server instance. You use this user ID when you create the server instance in a later step.

   Create a user ID and group that will be the owner of the Tivoli Storage Manager server instance.

   a. The following commands can be run from an administrative user ID that will set up the user and group. Create the user ID and group in the home directory of the user.

      Restriction: In the user ID, only lowercase letters (a-z), numerals (0-9), and the underscore character (_) can be used. The user ID and group name must comply with the following rules:
      - The length must be 8 characters or less.
      - The user ID and group name cannot start with *ibm*, *sql*, *sys*, or a numeral.

- The user ID and group name cannot be *user*, *admin*, *guest*, *public*, *local*, or any SQL reserved word.

  For example, create user ID `tsminst1` in group `tsmsrvrs`. The following examples show how to create this user ID and group using operating system commands.

  ```
  groupadd tsmsrvrs
  useradd -d /export/home/tsminst1 -m -g tsmsrvrs
      -s /bin/ksh tsminst1
  passwd tsminst1
  ```

  b. Log off, then log in to your system. Change to the user account that you just created. Use an interactive login program, such as telnet, so that you are prompted for the password and can change it if necessary.

2. Create directories that the server requires. Ensure that you are logged in under the new user ID you just created.

Create empty directories for each of the items shown in the following table. Mount the associated storage to each directory for the active log, archive log and database directories.

Item	Example commands for creating the directories	Your directories
The *instance directory* for the server, which is a directory that will contain files specifically for this server instance (the server options file and other server-specific files)	`mkdir /tsminst1`	

The database directories	`mkdir /home/user_ID/tsmdb001`
	`mkdir /home/user_ID/tsmdb002`
	`mkdir /home/user_ID/tsmdb003`
	`mkdir /home/user_ID/tsmdb004`	

Active log directory	`mkdir /home/user_ID/tsmlog`	
Archive log directory	`mkdir /home/user_ID/` `tsmarchlog`	
Optional: Directory for the log mirror for the active log	`mkdir /home/user_ID/` `tsmlogmirror`	
Optional: Secondary archive log directory (failover location for archive log)	`mkdir /home/user_ID/` `tsmarchlogfailover`	

When a server is initially created, with the **DSMSERV FORMAT** utility or with the configuration wizard, a server database and recovery log are created. In addition, files are created to hold database information that is used by the database manager.

3. If a configuration profile does not exist for the user ID, create the file. For example, create a `.profile` file if you are using the Korn shell (ksh).

4. Log off the new user ID.

Configuring Tivoli Storage Manager

After you have installed Tivoli Storage Manager Version 6.3 or later and prepared for the configuration, configure the Tivoli Storage Manager server instance.

Configure a Tivoli Storage Manager server instance by selecting one of the following options:

- Use the Tivoli Storage Manager configuration wizard on your local system. See "Configuring Tivoli Storage Manager using the configuration wizard."
- Use the Tivoli Storage Manager configuration wizard in the Administration Center. See "Configuring Tivoli Storage Manager using the Administration Center" on page 48.
- Manually configure the new Tivoli Storage Manager instance. See "Configuring the server instance manually" on page 49. Complete the following steps during a manual configuration.
  1. Set up the directories and create the Tivoli Storage Manager instance. See "Creating the server instance" on page 50.
  2. Create a new server options file by copying the sample file in order to set up communications between the Tivoli Storage Manager server and clients. See "Configuring server and client communications" on page 51.
  3. Issue the DSMSERV FORMAT command to format the database. See "Formatting the database and log" on page 55.
  4. Configure your system for database backup. See "Preparing the database manager for backup" on page 46.

Configuring Tivoli Storage Manager using the configuration wizard

The wizard offers a guided approach to configuring a server. By using the graphical user interface (GUI), you can avoid some configuration steps that are complex when done manually. Start the wizard on the system where you installed the Tivoli Storage Manager server program.

Before beginning the configuration wizard, you must complete all preceding steps to prepare for the configuration, including installing Tivoli Storage Manager, creating the database and log directories, and creating the directories and user ID for the server instance.

1. Ensure that the following requirements are met:

   - The system where you installed Tivoli Storage Manager must have the X Window System client. You must also be running an X Window System server on your desktop.
   - The system must have one of the following protocols enabled. Ensure that the port that the protocol uses is not blocked by a firewall.
     - Secure Shell (SSH). Ensure that the port is set to the default value, 22. Also ensure that the SSH daemon service has access rights for connecting to the system by using `localhost`.
     - Remote shell (RSH).
     - Remote Execution Protocol (REXEC).
   - You must be able to log in to Tivoli Storage Manager with the user ID that you created for the server instance, by using the SSH, RSH,

or REXEC protocol. When using the wizard, you must provide this user ID and password to access that system.

2. Start the local version of the wizard:

Open the dsmicfgx program in the `/opt/tivoli/tsm/server/bin` directory. This wizard can only be run as a root user.

Follow the instructions to complete the configuration. The wizard can be stopped and restarted, but the server is not operational until the entire configuration process is complete.

Preparing the database manager for backup

To back up the data in the database to Tivoli Storage Manager, you must enable the database manager and configure the Tivoli Storage Manager application programming interface (API).

If you use the Tivoli Storage Manager configuration wizard to create a Tivoli Storage Manager server instance, you do not have to complete these steps. If you are configuring an instance manually, complete the following steps before issuing either the BACKUP DB or the RESTORE DB commands.

Attention: If the database is unusable, the entire Tivoli Storage Manager server is unavailable. If a database is lost and cannot be recovered, it might be difficult or impossible to recover data managed by that server. Therefore, it is critically important to back up the database. However, even without the database, fragments of data or complete files might easily be read from storage pool volumes that are not encrypted. Even if data is not recovered, security can be compromised. For this reason, sensitive data must always be encrypted by the Tivoli Storage Manager client or the storage device, unless the storage media is physically secured.

In the following commands, the examples use `tsminst1` for the server instance user ID and `/home/tsminst1/tsminst1` for the Tivoli Storage Manager server instance directory. Replace these values with your actual values in the commands.

1. Set the Tivoli Storage Manager API environment-variable configuration for the database instance:

   a. Log in using the `tsminst1` user ID.

   b. When user `tsminst1` is logged in, ensure that the DB2 environment is properly initialized. The DB2 environment is initialized by running the `/home/tsminst1/sqllib/db2profile` script, which normally runs automatically from the profile of the user ID. If `/home/tsminst1/.profile` does not run the db2profile script,add the following lines to `/home/tsminst1/.profile`:

```
if [ -f /home/tsminst1/sqllib/db2profile ]; then
    . /home/tsminst1/sqllib/db2profile
  fi
```

   c. In the `userprofile` file in the `/home/tsminst1/sqllib` directory, add or update the following lines:

   Korn or Bash shell:

```
export DSMI_CONFIG=/home/tsminst1/tsminst1/tsmdbmgr.opt
export DSMI_DIR=/opt/tivoli/tsm/client/api/bin64
export DSMI_LOG=/home/tsminst1/tsminst1
```

   Bourne shell:

```
DSMI_CONFIG=/home/tsminst1/tsminst1/tsmdbmgr.opt
DSMI_DIR=/opt/tivoli/tsm/client/api/bin64
DSMI_LOG=/home/tsminst1/tsminst1
export DSMI_CONFIG DSMI_DIR DSMI_LOG
```

C shell:

```
setenv DSMI_CONFIG=/home/tsminst1/tsminst1/tsmdbmgr.opt
setenv DSMI_DIR=/opt/tivoli/tsm/client/api/bin64
setenv DSMI_LOG=/home/tsminst1/tsminst1
```

2. Log out and log in again as tsminst1, or issue this command:

```
. ~/.profile
```

Tip: Ensure that you enter a space after the initial dot (.) character.

3. Create a file called `tsmdbmgr.opt` in the `/tsminst1` directory and add the following line:

```
SERVERNAME TSMDBMGR_TSMINST1
```

Remember: The name that you use must match your server instance name.

4. Add the following lines to the Tivoli Storage Manager API dsm.sys configuration file. The dsm.sys configuration file is in the following default location:

```
/opt/tivoli/tsm/client/api/bin64/dsm.sys
```

Avoid placing the server name, TSMDBMGR_TSMINST1, first in dsm.sys because it should not be the system-wide default. In this example, the added lines are after the stanza for server_a.

```
Servername server_a
COMMMethod TCPip
TCPPort 1500
TCPServeraddress node.domain.company.COM


servername TSMDBMGR_TSMINST1
commmethod tcpip
tcpserveraddr localhost
tcpport 1500
passwordaccess generate
passworddir /home/tsminst1/tsminst1
errorlogname /home/tsminst1/tsminst1/tsmdbmgr.log
nodename $$_TSMDBMGR_$$
```

Tip: Ensure that you enter the same `tcpport` as the server is using. This is specified in the `dsmserv.opt` file.

5. Stop and start the database instance:

   a. Stop DB2:
      ```
      db2stop
      ```
   b. Start DB2:
      ```
      db2start
      ```

6. Set the API password:

   a. Ensure that the Tivoli Storage Manager server is started. See "Starting the server instance on AIX, HP-UX, Linux, and Solaris systems" on page 59 for the details.

   b. Log in using the root user ID.

   c. Source the database manager profile by issuing the following command. Ensure that you enter a dot, a space, and the path to the `db2profile` file. If you do not enter the space, the database backup fails.

   Important: Switch to the Korn shell (/bin/ksh) before issuing the following command.

   ```
   . /home/tsminst1/sqllib/db2profile
   ```

        d. Change the API password. Use this command:

            `/home/tsminst1/sqllib/adsm/dsmapipw`

        e. When prompted by the dsmapipw command, specify TSMDBMGR as both the
original and new password.

        f. Enter this operating system command:

            `rm /home/tsminst1/tsminst1/tsmdbmgr.log`

Configuring Tivoli Storage Manager using the Administration Center

The Administration Center wizard offers a guided approach to configuring a server. By using this wizard, you can avoid some configuration steps that are complex when done manually.

Before beginning the configuration wizard, you must complete all preceding steps to prepare for the configuration. The preceding steps include installing the Version 6.3 or later server program, creating the database and log directories, and creating the directories and user ID for the server instance.

1. Ensure that the following requirements are met:

   - The system must have one of the following protocols enabled. Ensure that the port that the protocol uses is not blocked by a firewall.
     - Secure Shell (SSH). Ensure that the port is set to the default value, 22. Also ensure that the SSH daemon service has access rights for connecting to the system by using `localhost`.
     - Remote shell (RSH).
     - Remote Execution Protocol (REXEC).
   - You must be able to log in to the Version 6.3 or later system with the user ID that you created for the server instance, by using the SSH, RSH, or REXEC protocol. When using the wizard, you must provide this user ID and password to access that system.

2. Open the Administration Center by entering one of the following addresses in a supported web browser:

   ```
   http://workstation_name:non_secure_port/ibm/console
   ```

   Or:

   ```
   https://workstation_name:secure_port/ibm/console
   ```

   The *workstation_name* is the network name or IP address of the computer on which you installed the Administration Center. The *non_secure_port* is the HTTP port and the *secure_port* is the HTTPS port.

   Attention: Use the port number that was shown in the summary panel of the installation wizard, which might be different from the port that you specified in the wizard. If you use an incorrect port, no warning messages are shown but you are not able to complete all Administration Center tasks.

The default HTTP port is 16310. The default HTTPS port is 16311. If you use a different port number from the default, the secure port typically appears as the non-secure port plus 1.

Look in the following file to see the port that is being used. In this file, **WC_defaulthost** contains the value for the HTTP port and **WC_adminhost_secure** contains the value for the HTTPS port.

   TIP_HOME/properties/TIPPortDef.properties

where *TIP_HOME* is the home directory for the Tivoli Integrated Portal installation.

   The default for *TIP_HOME* is /opt/IBM/tivoli/tipv2.

Tips:
- If you use http://*workstation_name*:16310/ibm/console to connect to the Administration Center, you are automatically redirected to the secure port and address.
- A file named Tivoli_Storage_Manager_Administration_Center.htm is created in the tsmac directory of the Administration Center installation directory. Open this file in a web browser to automatically connect to the Administration Center.

3. Log in, using the Tivoli Integrated Portal user ID and password you created during the installation. After you successfully log in, the Tivoli Integrated Portal welcome page is displayed. 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.

4. Go to **Tivoli Storage Manager** > **Manage Servers** and use the menu to find the Create Server Instance wizard.

5. After you open the Create Server Instance wizard, a list of tasks for setting up a Tivoli Storage Manager server instance displays. Click **Next** to continue.

6. Enter the TCP/IP server address and system administrator's (root user ID) logon credentials, and click **Next**.

7. Specify the instance and server configuration information, by using the wizard to guide you.

8. Verify the settings on the Summary page. After you have verified the information, click **Finish**. The Tivoli Storage Manager instance is configured in steps as indicated in the progress bar on the following page.

After the configuration is finished, the wizard exits to the Manage Servers page where you can find your new server.

Configuring the server instance manually

After installing Tivoli Storage Manager Version 6.3 or later, you can configure Tivoli Storage Manager manually instead of using the configuration wizard.

Creating the server instance

Create a Tivoli Storage Manager instance by issuing the **db2icrt** command.

You can have one or more server instances on one workstation.

Important: Before you run the **db2icrt** command, verify the following items:
- The home directory for the user (/home/tsminst1) exists. If there is no home directory, you must create it.

  The instance directory stores the following core files that are generated by the Tivoli Storage Manager server:
  - The server options file, dsmserv.opt
  - The server key database file, cert.kdb, and the .arm files (used by clients and other servers to import the Secure Sockets Layer certificates of the server)
  - Device configuration file, if the DEVCONFIG server option does not specify a fully qualified name
  - Volume history file, if the VOLUMEHISTORY server option does not specify a fully qualified name
  - Volumes for **DEVTYPE**=**FILE** storage pools, if the directory for the device class is not fully specified, or not fully qualified
  - User exits
  - Trace output (if not fully qualified)
- A shell configuration file (for example, .profile) exists in the home directory. The root user and instance user ID must have write permission to this file. For more information, see the section on Linux and UNIX environment variable settings in the DB2 Information Center (http://pic.dhe.ibm.com/infocenter/db2luw/v9r7).

1. Log in using the root user ID and create a Tivoli Storage Manager instance. The name of the instance must be the same name as the user that owns the instance. Use the **db2icrt** command and enter the command on one line:

   ```
   /opt/tivoli/tsm/db2/instance/db2icrt -a server -s ese -u
   instance_name instance_name
   ```

   For example, if your user ID for this instance is tsminst1, use the following command to create the instance. Enter the command on one line.

   ```
   /opt/tivoli/tsm/db2/instance/db2icrt -a server -s ese -u
   tsminst1 tsminst1
   ```

   Remember: From this point on, use this new user ID when configuring your Tivoli Storage Manager server. Log out of the root user ID and log in under the new instance-user ID.

2. Change the default directory for the database to be the same as the instance directory for the server. If you have multiple servers, log in under the instance ID for each server. Issue this command:

   ```
   db2 update dbm cfg using dftdbpath instance_directory
   ```

   For example:

   ```
   db2 update dbm cfg using dftdbpath /tsminst1
   ```

3. Modify the library path to use the version of the IBM Global Security Kit (GSKit) that is installed with the Tivoli Storage Manager server:

   You must update the following files to set the library path when DB2 or the Tivoli Storage Manager server are started:

   ```
   instance_directory/sqllib/usercshrc
   ```

`instance_directory`/sqllib/userprofile

For the `instance_directory`/sqllib/usercshrc file, add the following lines:

`setenv LD_LIBRARY_PATH /opt/ibm/gsk8_64/lib64:$LD_LIBRARY_PATH`

For the `instance_directory`/sqllib/userprofile file, add the following lines:

```
LD_LIBRARY_PATH=/opt/ibm/gsk8_64/lib64:$LD_LIBRARY_PATH
export LD_LIBRARY_PATH
```

Verify the library path settings and that the GSKit is version 8.0.14.14 or later. Issue the following commands:

```
echo $LD_LIBRARY_PATH
gsk8capicmd_64 -version
gsk8ver_64
```

If your GSKit version is not 8.0.14.14 or later, you must reinstall the Tivoli Storage Manager server. The reinstallation ensures that the correct GSKit version is available.

4. Create a new server options file. See "Configuring server and client communications."

Configuring server and client communications

A default sample server options file, dsmserv.opt.smp, is created during Tivoli Storage Manager installation in the /opt/tivoli/tsm/server/bin directory. You must set up communications between the server and clients by creating a new server options file. To do so, copy the sample file to the directory for the server instance.

Ensure that you have a server instance directory, for example /tsminst1/instance1, and copy the sample file to this directory. Name the new file `dsmserv.opt` and edit the options. Complete this set-up before you initialize the server database (see "Formatting the database and log" on page 55). Each sample or default entry in the sample options file is a comment, a line beginning with an asterisk (*). Options are not case-sensitive and one or more blank spaces are allowed between keywords and values.

When editing the options file, follow these guidelines:
- Remove the asterisk at the beginning of the line to activate an option.
- Begin entering the options in any column.
- Enter only one option per line, and the option must be on only one line.
- If you make multiple entries for a keyword, the Tivoli Storage Manager server uses the last entry.

If you change the server options file, you must restart the server for the changes to take effect. See the *Administrator's Reference* for a description of all server options.

You can specify one or more of the following communication methods:
- TCP/IP Version 4 or Version 6
- Shared memory
- Simple network management protocol (SNMP) DPI
- Secure Sockets Layer (SSL)

   Note: You can authenticate passwords with the LDAP directory server, or authenticate passwords with the Tivoli Storage Manager server. Passwords that are authenticated with the LDAP directory server can provide enhanced system security. For details, see the managing passwords and logon procedures section in the *Administrator's Guide*.

Installing the Tivoli Storage Manager server

Setting TCP/IP options:

Select from a range of TCP/IP options for the Tivoli Storage Manager server or retain the default.

The following is an example of a list of TCP/IP options you can use to set up your system.

```
commmethod       tcpip
  tcpport        1500
  tcpwindowsize  0
  tcpnodelay     yes
```

Tip: You can use TCP/IP Version 4, Version 6, or both.

TCPPORT
> The server TCP/IP port address. The default value is 1500.

TCPWINDOWSIZE
> Specifies the size of the TCP/IP buffer that is used when sending or receiving data. The window size that is used in a session is the smaller of the server and client window sizes. Larger window sizes use additional memory but can improve performance.
>
> You can specify an integer from 0 to 64. To use the default window size for the operating system, specify 0.

TCPNODELAY
> Specifies whether or not the server sends small messages or lets TCP/IP buffer the messages. Sending small messages can improve throughput but increases the number of packets sent over the network. Specify YES to send small messages or NO to let TCP/IP buffer them. The default is YES.

TCPADMINPORT
> Specifies the port number on which the server TCP/IP communication driver is to wait for requests other than client sessions. The default value is 1500.

SSLTCPPORT
> (SSL-only) Specifies the Secure Sockets Layer (SSL) port number on which the server TCP/IP communication driver waits for requests for SSL-enabled sessions for the command-line backup-archive client and the command-line administrative client.

SSLTCPADMINPORT
> Specifies the port address on which the server TCP/IP communication driver waits for requests for SSL-enabled sessions for the command-line administrative client.

Setting shared memory options:

You can use shared memory communications between clients and servers on the same system. To use shared memory, TCP/IP Version 4 must be installed on the system.

Shared memory options is the default communication method.

The following example shows a shared memory setting:

```
commmethod      sharedmem
   shmport      1510
```

In this example, SHMPORT specifies the TCP/IP port address of a server when using shared memory. Use the SHMPORT option to specify a different TCP/IP port. The default port address is 1510.

COMMMETHOD can be used multiple times in the IBM Tivoli Storage Manager server options file, with a different value each time. For example, the following example is possible:

```
commmethod tcpip
commmethod sharedmem
```

The maximum number of concurrent shared memory sessions is based on available system resources. Each shared memory session uses one shared memory region of up to 4 MB, and four IPCS message queues, depending on the Tivoli Storage Manager client level.

Ensure that you have run the DB2OSCONF utility so that the maximum number of message queues (MSGMNI) is correct.

If the server and client are not run under the same user ID, then the server must be root. This prevents shared memory communication errors.

Setting SNMP DPI subagent options:

Tivoli Storage Manager implements a simple network management protocol (SNMP) subagent. You can configure the SNMP subagent to send traps to an SNMP manager, such as NetView®, and to provide support for a Management Information Base (MIB).

For details about configuring SNMP for use with Tivoli Storage Manager, see the *Administrator's Guide*.

The subagent communicates with the snmp daemon, which in turn communicates with a management application. The snmp daemon must support the DPI protocol. Agents are available on AIX. The subagent process is separate from the Tivoli Storage Manager server process, but the subagent gets its information from a server options file. When the SNMP management application is enabled, it can get information and messages from servers.

Use the following SNMP DPI options as an example of a SNMP setting. You must specify the COMMMETHOD option. For details about the other options, see the *Administrator's Reference*.

Installing the Tivoli Storage Manager server

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

Setting Secure Sockets Layer options:

You can add more protection for your data and passwords by using Secure Sockets Layer (SSL).

SSL is the standard technology for creating encrypted sessions between servers and clients. SSL provides a secure channel for servers and clients to communicate over open communication paths. With SSL, the identity of the server is verified through the use of digital certificates.

To ensure better system performance, use SSL only for sessions when it is needed. Consider adding additional processor resources on the Tivoli Storage Manager server to manage the increased requirements.

Refer to setting up Transport Layer Security (TLS) in the *Administrator's Guide*.

Formatting the database and log

Use the **DSMSERV FORMAT** utility to initialize a server instance. No other server activity is allowed while initializing the database and recovery log.

After you set up server communications, you are ready to initialize the database. Ensure that you log in by using the instance user ID. Do not place the directories on file systems that might run out of space. If certain directories (for example, the archive log) become unavailable or full, the server stops. See "Capacity planning" on page 10 for more details.

For optimal performance and to facilitate I/O, specify at least two equally sized containers or Logical Unit Numbers (LUNs) for the database. See *Optimizing Performance* for more information about the configuration of directories for the database. In addition, each active log and archive log should have its own container or LUN.

Setting the server code page

Set the DB2CODEPAGE system environment variable to 819 for each server instance. Before you issue the **DSMSERV LOADFORMAT** command, log on to the system as the server instance owner and issue this command:

```
db2set -i instance_name DB2CODEPAGE=819
```

For example:

```
db2set -i tsminst1 DB2CODEPAGE=819
```

Initializing a server instance

Use the **DSMSERV FORMAT** utility to initialize a server instance. For example, issue the following command:

```
dsmserv format dbdir=/tsmdb001 activelogsize=8192
activelogdirectory=/activelog archlogdirectory=/archlog
archfailoverlogdirectory=/archfaillog mirrorlogdirectory=/mirrorlog
```

Tip: If DB2 does not start after you issue the **DSMSERV FORMAT** command, you might need to disable the file system mount option NOSETUID. If this option is set on the file system that contains the DB2 instance owner directory, or on any file system that contains the DB2 database, active logs, archive logs, failover logs, or mirrored logs, the option must be disabled to start the system.

After you disable the NOSETUID option, remount the file system and then start DB2 by issuing the following command:

```
db2start
```

For more information, see the *Administrator's Reference*.

Preparing the database manager for backup

To back up the data in the database to Tivoli Storage Manager, you must enable the database manager and configure the Tivoli Storage Manager application programming interface (API).

If you use the Tivoli Storage Manager configuration wizard to create a Tivoli Storage Manager server instance, you do not have to complete these steps. If you are configuring an instance manually, complete the following steps before issuing either the BACKUP DB or the RESTORE DB commands.

Installing the Tivoli Storage Manager server

Attention: If the database is unusable, the entire Tivoli Storage Manager server is unavailable. If a database is lost and cannot be recovered, it might be difficult or impossible to recover data managed by that server. Therefore, it is critically important to back up the database. However, even without the database, fragments of data or complete files might easily be read from storage pool volumes that are not encrypted. Even if data is not recovered, security can be compromised. For this reason, sensitive data must always be encrypted by the Tivoli Storage Manager client or the storage device, unless the storage media is physically secured.

In the following commands, the examples use `tsminst1` for the server instance user ID and `/home/tsminst1/tsminst1` for the Tivoli Storage Manager server instance directory. Replace these values with your actual values in the commands.

1. Set the Tivoli Storage Manager API environment-variable configuration for the database instance:

   a. Log in using the `tsminst1` user ID.

   b. When user `tsminst1` is logged in, ensure that the DB2 environment is properly initialized. The DB2 environment is initialized by running the `/home/tsminst1/sqllib/db2profile` script, which normally runs automatically from the profile of the user ID. If `/home/tsminst1/.profile` does not run the db2profile script, add the following lines to `/home/tsminst1/.profile`:

      ```
      if [ -f /home/tsminst1/sqllib/db2profile ]; then
           . /home/tsminst1/sqllib/db2profile
        fi
      ```

   c. In the `userprofile` file in the `/home/tsminst1/sqllib` directory, add or update the following lines:

      Korn or Bash shell:

      ```
      export DSMI_CONFIG=/home/tsminst1/tsminst1/tsmdbmgr.opt
      export DSMI_DIR=/opt/tivoli/tsm/client/api/bin64
      export DSMI_LOG=/home/tsminst1/tsminst1
      ```

      Bourne shell:

      ```
      DSMI_CONFIG=/home/tsminst1/tsminst1/tsmdbmgr.opt
      DSMI_DIR=/opt/tivoli/tsm/client/api/bin64
      DSMI_LOG=/home/tsminst1/tsminst1
      export DSMI_CONFIG DSMI_DIR DSMI_LOG
      ```

      C shell:

      ```
      setenv DSMI_CONFIG=/home/tsminst1/tsminst1/tsmdbmgr.opt
      setenv DSMI_DIR=/opt/tivoli/tsm/client/api/bin64
      setenv DSMI_LOG=/home/tsminst1/tsminst1
      ```

2. Log out and log in again as tsminst1, or issue this command:

   ```
   . ~/.profile
   ```

   Tip: Ensure that you enter a space after the initial dot (.) character.

3. Create a file called `tsmdbmgr.opt` in the `/tsminst1` directory and add the following line:

   ```
   SERVERNAME TSMDBMGR_TSMINST1
   ```

   Remember: The name that you use must match your server instance name.

4. Add the following lines to the Tivoli Storage Manager API dsm.sys configuration file. The dsm.sys configuration file is in the following default location:

   ```
   /opt/tivoli/tsm/client/api/bin64/dsm.sys
   ```

Avoid placing the server name, TSMDBMGR_TSMINST1, first in dsm.sys because it should not be the system-wide default. In this example, the added lines are after the stanza for server_a.

```
Servername server_a
COMMMethod TCPip
TCPPort 1500
TCPServeraddress node.domain.company.COM


servername TSMDBMGR_TSMINST1
commmethod tcpip
tcpserveraddr localhost
tcpport 1500
passwordaccess generate
passworddir /home/tsminst1/tsminst1
errorlogname /home/tsminst1/tsminst1/tsmdbmgr.log
nodename $$_TSMDBMGR_$$
```

Tip: Ensure that you enter the same `tcpport` as the server is using. This is specified in the `dsmserv.opt` file.

5. Stop and start the database instance:

   a. Stop DB2:

      ```
      db2stop
      ```

   b. Start DB2:

      ```
      db2start
      ```

6. Set the API password:

   a. Ensure that the Tivoli Storage Manager server is started. See "Starting the server instance on AIX, HP-UX, Linux, and Solaris systems" on page 59 for the details.

   b. Log in using the root user ID.

   c. Source the database manager profile by issuing the following command. Ensure that you enter a dot, a space, and the path to the `db2profile` file. If you do not enter the space, the database backup fails.

      Important: Switch to the Korn shell (/bin/ksh) before issuing the following command.

      ```
      . /home/tsminst1/sqllib/db2profile
      ```

   d. Change the API password. Use this command:

      ```
      /home/tsminst1/sqllib/adsm/dsmapipw
      ```

   e. When prompted by the dsmapipw command, specify TSMDBMGR as both the original and new password.

   f. Enter this operating system command:

      ```
      rm /home/tsminst1/tsminst1/tsmdbmgr.log
      ```

Configuring server options for server database maintenance

To help avoid problems with database growth and server performance, the server automatically monitors its database tables and reorganizes them when needed. Before starting the server for production use, set server options to control when reorganization runs. If you plan to use deduplication, ensure that the option to run index reorganization is enabled.

Table and index reorganization requires significant processor resources, active log space, and archive log space. Because database backup takes precedence over reorganization, select the time and duration for reorganization to ensure that the processes do not overlap and reorganization can complete. For more information about scheduling reorganization, see *Administrator's Guide*.

If you update these server options while the server is running, you must stop and restart the server before the updated values take effect.

1. Modify the server options.

   Edit the server options file, `dsmserv.opt`, in the server instance directory. Follow these guidelines when editing the server options file:

   - To activate an option, remove the asterisk at the beginning of the line.
   - Begin entering an option on any line.
   - Enter only one option per line. The entire option with its value must be on one line.
   - If you have multiple entries for an option in the file, the server uses the last entry.
   - To view available server options, see the sample file, `dsmserv.opt.smp`, in the `/opt/tivoli/tsm/server/bin` directory.

2. If you plan to use deduplication, enable the **ALLOWREORGINDEX** server option. Add the following option and value to the server options file:

   `allowreorgindex yes`

3. Set two server options that control when reorganization starts and how long it runs. Select a time and duration so that reorganization runs when you expect that the server is least busy. These server options control both table and index reorganization processes.

   a. Set the time for reorganization to start by using the **REORGBEGINTIME** server option. Specify the time by using the 24-hour system. For example, to set the start time for reorganization as 8:30 p.m., specify the following option and value in the server options file:

      `reorgbegintime 20:30`

   b. Set the interval during which the server can start reorganization. For example, to specify that the server can start reorganization for four hours after the time set by the **REORGBEGINTIME** server option, specify the following option and value in the server options file:

      `reorgduration 4`

4. If the server was running while you updated the server options file, stop and restart the server.

Configuring access rights to deployment engine files

When you install the Tivoli Storage Manager server, the deployment engine is installed automatically on the same system. The deployment engine installs Tivoli Storage Manager components. You can configure access rights to the files that are controlled by the deployment engine.

The deployment engine is installed globally by using the root user ID. The deployment engine makes it possible for administrators with non-root user IDs to upgrade and install the components that were installed by the deployment engine. The deployment engine also makes certain files accessible to all system users.

The following table describes how to set access levels for the files that are controlled by the deployment engine. To view, set, or refresh the access level, issue the specified command on one line.

Table 21. Commands for setting access rights to files that are controlled by the deployment engine

Action	Description	Command/File path
View access level	Shows the current access level	`/usr/ibm/common/acsi/bin/de_security.sh`
Set single-user write access	Grants only the user who installed the deployment engine write access to the deployment engine files	`/usr/ibm/common/acsi/bin/de_security.sh -singleUser`
Set group access	Grants the current user and members of the specified group write access to the deployment engine files	`/usr/ibm/common/acsi/bin/de_security.sh -group` *groupname*
Set global access rights	Grants all users write access to the deployment engine files	`/usr/ibm/common/acsi/bin/de_security.sh -global`
Refresh access levels	Shows updated access levels	`/usr/ibm/common/acsi/bin/de_security.sh -refreshDB`

Starting the server instance on AIX, HP-UX, Linux, and Solaris systems

Verify that the server instance is correctly set up by starting the Tivoli Storage Manager instance. You can start the server when logged in to the system with the user ID that you created for this instance. Before you start the server, ensure that the server options file, `dsmserv.opt`, exists and that ulimit values are set correctly.

Verify that the `dsmserv.opt` file exists in the server instance directory, and that the file includes parameters for the server instance. If you have not yet created a `dsmserv.opt` file, see "Configuring server and client communications" on page 51.

Starting the server is an operating system-level operation and has certain restrictions. If you do not have the permissions to use the dsmserv program, you

cannot start it. If you do not have authority to read/write files in the instance directory, you cannot start that instance of the server. If you do not have authority for the server DB2 database, you cannot start that instance of the server.

Important: When you start the Tivoli Storage Manager server, the server attempts to change certain ulimit values to unlimited. In general, this server action helps to ensure optimal performance and facilitates debugging. If you are a non-root user when you start the server, attempts to change the ulimit values might fail. To ensure correct server operation if you are running the server as a non-root user, set the ulimit values as high as possible before you start the server.

This task includes setting DB2 user limits as high as possible. DB2 relies on private data memory for sort memory allocations during SQL processing. Insufficient shared heap memory can lead to Tivoli Storage Manager server failures during interaction with DB2. For more information about setting the appropriate values, see Technote 1212174 (http://www.ibm.com/support/docview.wss?uid=swg21212174).

For guidance in setting ulimit values, see the following table:

Table 22. Ulimit values

Ulimit type	Standard value
Maximum size of core files created	Unlimited
Maximum size of a data segment for a process	Unlimited
Maximum file size	Unlimited
Maximum number of open files	• For servers on which replication, data deduplication, or both are enabled, specify a minimum value of 16384. • For all other servers, specify a minimum value of 8192.
Maximum amount of processor time in seconds	Unlimited

For instructions about setting ulimit values, see the documentation for your operating system.

If you do not start the server automatically by using the `rc.dsmserv` or `dsmsta.rc` utility, run the `rsmtdev` utility as the root user before you start the server. The **rmstdev** utility detects and deletes device special files that are created by the Oracle Solaris st device driver. If these files exist on the system and you are using the Tivoli Storage Manager or IBM tape device driver, data can be overwritten.

Starting the server from the instance user ID

The instance user ID has a user profile that enables it to run the server with the required permissions.

To start a Tivoli Storage Manager server from the instance user ID, complete the following steps:

1. Log in to the system where Tivoli Storage Manager is installed by using the instance user ID for the Tivoli Storage Manager server.

2. If you do not have a user profile that runs the db2profile script, issue the following command:

   ```
   . /home/tsminst1/sqllib/db2profile
   ```

   Tip: For information about updating the user ID login script to run the db2profile script automatically, see the DB2 documentation.

3. Start the server by issuing the following command from the server instance directory:

   ```
   /opt/tivoli/tsm/server/bin/dsmserv
   ```

   Tip: The command runs in the foreground so that you can set an administrator ID and connect to the server instance.

   For example, if the name of the Tivoli Storage Manager server instance is tsminst1, you can start the instance by issuing the following commands:

   ```
   cd /tsminst1
   . ~/sqllib/db2profile
   /opt/tivoli/tsm/server/bin/dsmserv
   ```

4. Optional: To start the server in the background, issue the following command:

   ```
   /opt/tivoli/tsm/server/bin/dsmserv -q &
   ```

   Remember: If you set up the Tivoli Storage Manager server as a service by using the Solaris Service Management Facility (SMF), you can start the service by issuing the `svcadm enable` command. For more information, see Technote 7021102.

Starting the server from the root user ID

The standard way to start the server is by using the instance user ID. However, in some cases, it might be necessary to use another user ID to start the server. For example, you might want to use the root user ID to ensure that the server can access specific devices.

For information about authorizing root users and starting the server by using the root user ID, see the *Administrator's Guide*.

Automatically starting servers on AIX, HP-UX, Linux, and Oracle systems

You can configure servers to start automatically at system startup. If the server is installed on an AIX, HP-UX, or Solaris operating system, use the `rc.dsmserv` script, which is provided for this purpose.

The `rc.dsmserv` script is in the `/opt/tivoli/tsm/server/bin` directory.

If the server is installed on a Linux operating system, you must use the `dsmserv.rc` script to automatically start the server.

Tip: If you used the upgrade wizard, you had the choice of starting the upgraded server automatically when the system is restarted. If you selected that choice, an entry for the server was added to the `/etc/inittab` file.

For each server that you want to automatically start, add an entry to the `/etc/inittab` file to run the `rc.dsmserv` script.

- Set the run level to the value that corresponds to multiuser mode, with networking enabled. Typically, the run level to use is 2, 3, or 5, depending on

the operating system and its configuration. Ensure that the run level in the /etc/inittab file matches the run level of the operating system. Consult documentation for your operating system for details on run levels.

- On the **rc.dsmserv** command, specify the instance owner name with the **-u** option, and the location of the server instance directory with the **-i** option.

Verify correct syntax for the entry by consulting documentation for your operating system.

Example: Automatically starting a server instance

In this example, the instance owner is tsminst1; the server instance directory is /home/tsminst1/tsminst1; the run level is 3; and the process ID is tsm1. Add the following entry to /etc/inittab file, on one line:

```
tsm1:3:once:/opt/tivoli/tsm/server/bin/rc.dsmserv -u tsminst1
    -i /home/tsminst1/tsminst1 -q >/dev/console 2>&1
```

Example: Automatically starting several server instances

If you have more than one server instance that you want to run, add an entry for each server instance. This example uses the following instance owner IDs:

- tsminst1
- tsminst2

This example uses the following instance directories:

- /home/tsminst1/tsminst1
- /home/tsminst2/tsminst2

This example uses the following process IDs:

- tsm1
- tsm2

The run level is 3. Add the following entries to the /etc/inittab file. Ensure that each entry is on one line.

```
tsm1:3:once:/opt/tivoli/tsm/server/bin/rc.dsmserv -u tsminst1
    -i /home/tsminst1/tsminst1 -q >/dev/console 2>&1
tsm2:3:once:/opt/tivoli/tsm/server/bin/rc.dsmserv -u tsminst2
    -i /home/tsminst2/tsminst2 -q >/dev/console 2>&1
```

Tip: Optional: Use the Solaris Service Management Facility (SMF) to set up and control Tivoli Storage Manager server instances. For more information, see Technote 7021102.

Stopping the server

You can stop the server without warning if an unexpected problem requires you to return control to the operating system. To avoid losing administrative and client node connections, stop the server only after current sessions have completed or been canceled.

To stop the server, issue the following command from the Tivoli Storage Manager command prompt:

```
halt
```

The server console stops.

Remember: If you set up the Tivoli Storage Manager as a service by using the Solaris Service Management Facility (SMF), stop the service by issuing the **svcadm disable** command. For more information, see Technote 7021102.

Registering licenses

Immediately register any Tivoli Storage Manager licensed functions that you purchase so you do not lose any data after you start server operations, such as backing up your data.

Use the **REGISTER LICENSE** command for this task.

Example: Register a license

Register the base Tivoli Storage Manager license.

```
register license file=tsmbasic.lic
```

Preparing the system for backups

To prepare the system for automatic and manual database backups, you must specify the device class to be used.

Before you begin the setup, ensure that you have defined a tape or file device class. See the defining device classes section of the *Administrator's Guide*.

To set up your system for database backups, issue the **SET DBRECOVERY** command to specify a device class to be used for the backups. You can also change the device class to be used for database backups with the **SET DBRECOVERY** command.

Perform the following setup procedure:
1. If you did not use the configuration wizard (dsmicfgx) to configure the server, ensure that you have completed the steps to manually configure the system for database backups.
2. Select the device class to be used for backups of the database. Issue the following command from a IBM Tivoli Storage Manager administrative command line.

   ```
   set dbrecovery device_class_name
   ```

   The device class that you specify is used by the database manager for database backups. If you do not specify a device class with the **SET DBRECOVERY** command, the backup fails.

For example, to specify that the **DBBACK** device class is to be used, issue this command:

```
set dbrecovery dbback
```

When you are ready to back up your database, see the **BACKUP DB** command in the *Administrator's Reference*.

Running multiple server instances on a single system

You can create more than one server instance on your system. Each server instance has its own instance directory, and database and log directories.

Multiply the memory and other system requirements for one server by the number of instances planned for the system.

The set of files for one instance of the server is stored separately from the files used by another server instance on the same system. Use the steps in "Creating the server instance" on page 50 for each new instance, including creation of the new instance user.

To manage the system memory that is used by each server, use the DBMEMPERCENT server option to limit the percentage of system memory. If all servers are equally important, use the same value for each server. If one server is a production server and other servers are test servers, set the value for the production server to a higher value than the test servers.

If you are upgrading from Tivoli Storage Manager Version 6.1 to V6.2 or V6.3 or later and have multiple servers on your system, you must run the upgrade wizard only once. The upgrade wizard collects the database and variables information for all of your original server instances.

If you are upgrading from Tivoli Storage Manager Version 6.1 to V6.3 or later and have multiple servers on your system, all instances that exist in DB2 Version 9.5 are dropped and recreated in DB2 Version 9.7. The wizard issues the db2 upgrade db dbname command for each database. The database environment variables for each instance on your system are also reconfigured during the upgrade process.

For information about the Server Initialization wizard, see the *Tivoli Storage Manager Administrator's Guide*.

Monitoring the server

When you start using server in production operation, monitor the space used by the server to ensure that the amount of space is adequate. Make adjustments as needed.

1. Monitor the active log, to ensure that the size is correct for the workload that is handled by the server instance.

   When the server workload is up to its typical expected level, and the space that is used by the active log is 80 - 90% of the space that is available to the active log directory, you might need to increase the amount of space. Whether you need to increase the space depends on the types of transactions in the server's workload, because transaction characteristics affect how the active log space is used.

   The following transaction characteristics can affect the space usage in the active log:

   - The number and size of files in backup operations
     - Clients such as file servers that back up large numbers of small files can cause large numbers of transactions that complete during a short period of time. The transactions might use a large amount of space in the active log, but for a short period of time.

- Clients such as a mail server or a database server that back up large chunks of data in few transactions can cause small numbers of transactions that take a long time to complete. The transactions might use a small amount of space in the active log, but for a long period of time.
- Network connection types
  - Backup operations that occur over fast network connections cause transactions that complete more quickly. The transactions use space in the active log for a shorter period of time.
  - Backup operations that occur over relatively slower connections cause transactions that take a longer time to complete. The transactions use space in the active log for a longer period of time.

If the server is handling transactions with a wide variety of characteristics, the space that is used for the active log might go up and down by a large amount over time. For such a server, you might need to ensure that the active log typically has a smaller percentage of its space used. The extra space allows the active log to grow for transactions that take a very long time to complete, for example.

2. Monitor the archive log to ensure that space is always available.

   Remember: If the archive log becomes full, and the failover archive log becomes full, the active log can become full and the server will stop. The goal is to make enough space available to the archive log so that it never uses all its available space.
   You are likely to notice the following pattern:
   a. Initially, the archive log grows rapidly as typical client-backup operations occur.
   b. Database backups occur regularly, either as scheduled or done manually.
   c. After at least two full database backups occur, log pruning occurs automatically. The space used by the archive log decreases when the pruning occurs.
   d. Normal client operations continue, and the archive log grows again.
   e. Database backups occur regularly, and log pruning occurs as often as full database backups occur.

   With this pattern, the archive log grows initially, then decreases, then might grow again. Over a period of time, as normal operations continue, the amount of space used by the archive log should reach a relatively constant level.

   If the archive log continues to grow, consider taking one or both of these actions:
   - Add space to the archive log. This might mean moving the archive log to a different file system.
     For information about moving the archive log, see the *Tivoli Storage Manager Administrator's Guide*.
   - Increase the frequency of full database backups, so that log pruning occurs more frequently.

3. If you defined a directory for the failover archive log, determine whether any logs get stored in that directory during normal operations. If the failover log space is being used, consider increasing the size of the archive log. The goal is that the failover archive log is used only under unusual conditions, not in normal operation.

For details about monitoring, see the *Administrator's Guide*.

Monitoring space utilization for the database and recovery logs

To determine the amount of used and available active log space, you issue the **QUERY LOG** command. To monitor space utilization in the database and recovery logs, you can also check the activity log for messages.

Active log

If the amount of available active log space is too low, the following messages are displayed in the activity log:

ANR4531I: IC_AUTOBACKUP_LOG_USED_SINCE_LAST_BACKUP_TRIGGER
This message is displayed when the active log space exceeds the maximum specified size. The Tivoli Storage Manager server starts a full database backup.

To change the maximum log size, halt the server. Open the dsmserv.opt file, and specify a new value for the ACTIVELOGSIZE option. When you are finished, restart the server.

ANR0297I: IC_BACKUP_NEEDED_LOG_USED_SINCE_LAST_BACKUP
This message is displayed when the active log space exceeds the maximum specified size. You must back up the database manually.

To change the maximum log size, halt the server. Open the dsmserv.opt file, and specify a new value for the ACTIVELOGSIZE option. When you are finished, restart the server.

ANR4529I: IC_AUTOBACKUP_LOG_UTILIZATION_TRIGGER
The ratio of used active-log space to available active-log space exceeds the log utilization threshold. If at least one full database backup has occurred, the Tivoli Storage Manager server starts an incremental database backup. Otherwise, the server starts a full database backup.

ANR0295I: IC_BACKUP_NEEDED_LOG_UTILIZATION
The ratio of used active-log space to available active-log space exceeds the log utilization threshold. You must back up the database manually.

Archive log

If the amount of available archive log space is too low, the following message is displayed in the activity log:

ANR0299I: IC_BACKUP_NEEDED_ARCHLOG_USED
The ratio of used archive-log space to available archive-log space exceeds the log utilization threshold. The Tivoli Storage Manager server starts a full automatic database backup.

Database

If the amount of space available for database activities is too low, the following messages are displayed in the activity log:

ANR2992W: IC_LOG_FILE_SYSTEM_UTILIZATION_WARNING_2
The used database space exceeds the threshold for database space utilization. To increase the space for the database, use the **EXTEND DBSPACE** command, the **EXTEND DBSPACE** command, or the DSMSERV FORMAT utility with the **DBDIR** parameter.

Installing the Tivoli Storage Manager server

ANR1546W: FILESYSTEM_DBPATH_LESS_1GB

The available space in the directory where the server database files are located is less than 1 GB.

When a Tivoli Storage Manager server is created with the DSMSERV FORMAT utility or with the configuration wizard, a server database and recovery log are also created. In addition, files are created to hold database information used by the database manager. The path specified in this message indicates the location of the database information used by the database manager. If space is unavailable in the path, the server can no longer function.

You must add space to the file system or make space available on the file system or disk.

Chapter 3. Taking the first steps after you install Tivoli Storage Manager Version 6.3 or later   **67**

Installing the Tivoli Storage Manager server

Chapter 4. Installing a Tivoli Storage Manager server fix pack

Tivoli Storage Manager maintenance updates, which are also referred to as fix packs, bring your server up to the current maintenance level.

To install a fix pack or interim fix to the server, install the server at the level on which you want to run it. You do not have to start the server installation at the base release level. For example, if you currently have V6.1.2.1 installed, you can go directly to the latest fix pack for V6.3 or later. You do not have to start with the V6.3.0 installation if a maintenance update is available.

You must have the Tivoli Storage Manager license package installed. The license package is provided with the purchase of a base release. Alternatively, you can obtain the license package when download a fix pack from the Passport Advantage website. After the fix pack or interim fix is installed, install the license for the server. To display messages and help in a language other than US English, install the language package of your choice.

For information about the estimated time required to install a fix pack, see Techdoc 7023591.

If you upgrade the server to V6.3.4 or later, and then revert the server to a level that is earlier than V6.3.4, you must restore the database to a point in time before the upgrade. During the upgrade process, complete the required steps to ensure that the database can be restored: back up the database, the volume history file, the device configuration file, and the server options file. For more information, see Chapter 6, "Reverting from Version 6.3 or later to the previous Version 6 server," on page 91.

Before you upgrade the Tivoli Storage Manager server, ensure that you retain the installation media from the base release of the installed server. If you installed Tivoli Storage Manager from a DVD, ensure that the DVD is available. If you installed Tivoli Storage Manager from a downloaded package, ensure that the downloaded files are available. If the upgrade fails, and the server license module is uninstalled, the installation media from the server base release are required to reinstall the license.

Visit this website: http://www.ibm.com/support/entry/portal/Overview/Software/Tivoli/Tivoli_Storage_Manager for the following information:
- A list of the latest maintenance and download fixes. Click **Support and downloads** and apply any applicable fixes.
- Details about obtaining a base license package. Search for **Warranties and licenses**.
- Supported platforms and system requirements. Click **Server requirements**.

To install a fix pack or interim fix, complete the following steps.

Attention: Do not alter the DB2 software that is installed with Tivoli Storage Manager installation packages and fix packs. Do not install or upgrade to a different version, release, or fix pack of DB2 software because doing so can damage the database.

1. Log in as the root user.

Installing a Tivoli Storage Manager fix pack

2. Obtain the package file for the fix pack or interim fix that you want to install from the Tivoli Storage Manager FTP downloads site: ftp:// public.dhe.ibm.com/storage/tivoli-storage-management/maintenance/server.

3. Change to the directory where you placed the executable file and complete the following steps.

   Tip: The files are extracted to the current directory. Ensure that the executable file is in the directory where you want the extracted files to be located.

   a. Change file permissions by entering the following command:

   ```
   chmod a+x 6.x.x.x-TIV-TSMALL-platform.bin
   ```

   where *platform* denotes the architecture that Tivoli Storage Manager is to be installed on.

   b. Issue the following command to extract the installation files:

   ```
   ./6.x.x.x-TIV-TSMALL-platform.bin
   ```

4. Back up the database. The preferred method is to use a snapshot backup. A snapshot backup is a full database backup that does not interrupt any scheduled database backups. For example, issue the following Tivoli Storage Manager administrative command:

   ```
   backup db type=dbsnapshot devclass=tapeclass
   ```

   See the *Administrator's Guide* for more details.

5. Back up the device configuration information. Issue the following Tivoli Storage Manager administrative command:

   ```
   backup devconfig filenames=file_name
   ```

   where *file_name* specifies the name of the file in which to store device configuration information.

6. Save the volume history file to another directory or rename the file. Issue the following Tivoli Storage Manager administrative command:

   ```
   backup volhistory filenames=file_name
   ```

   where *file_name* specifies the name of the file in which to store the volume history information.

7. Save a copy of the server options file, typically named dsmserv.opt. The file is in the server instance directory.

8. Halt the server before installing a fix pack or interim fix. Use the **HALT** command.

9. Ensure that extra space is available in the installation directory. The installation of this fix pack might require additional temporary disk space in the installation directory of the server. The amount of additional disk space can be as much as that required for installing a new database as part of a Tivoli Storage Manager installation. The Tivoli Storage Manager installation wizard displays the amount of space that is required for installing the fix pack and the available amount. If the required amount of space is greater than the available amount, the installation stops. If the installation stops, add the required disk space to the file system and restart the installation.

10. Select one of the following ways of installing Tivoli Storage Manager.

    Important: After a fix pack is installed, it is not necessary to go through the configuration again. You can stop after completing the installation, fix any errors, then restart your servers.

Installation wizard
"Installing Tivoli Storage Manager by using the installation wizard" on page 31

Command-line console wizard
"Installing Tivoli Storage Manager by using the console installation wizard" on page 32

Silent mode
"Installing Tivoli Storage Manager in silent mode" on page 33

Fix any errors before continuing. The installation log, `installFixPack.log`, is stored in the following location:

coi/plan/tmp

Installing a Tivoli Storage Manager fix pack

Chapter 5. Upgrading to Tivoli Storage Manager Version 6.3 or later

You can upgrade an IBM Tivoli Storage Manager server from any version of 6.1 or 6.2 directly to Version 6.3 or later.

Table 23. Upgrade information

To upgrade from this version	To this version	See this information
V6.3 or later	V6.3 or later	Chapter 4, "Installing a Tivoli Storage Manager server fix pack," on page 69
V6.2	V6.3 or later	"Upgrading from Tivoli Storage Manager V6.2 to V6.3 or later" on page 74
V6.1	V6.3 or later	"Upgrading from Tivoli Storage Manager V6.1 to V6.3 or later" on page 79
V5.5	V6.3 or later	*Upgrade and Migration Guide for V5 Servers*

If a Tivoli Storage Manager V5 server is installed, and you prefer to upgrade the server to V6 on a different operating system, see the instructions for server migration:

Table 24. Migration information

To migrate the server from this operating system	To this operating system	See this information
AIX	Linux x86_64	Section about migrating Tivoli Storage Manager V5 servers on AIX, HP-UX, or Solaris systems to V6.3.4 on Linux in the *Upgrade and Migration Guide for V5 Servers*
HP-UX	Linux x86_64	Section about migrating Tivoli Storage Manager V5 servers on AIX, HP-UX, or Solaris systems to V6.3.4 on Linux in the *Upgrade and Migration Guide for V5 Servers*
Solaris	Linux x86_64	Section about migrating Tivoli Storage Manager V5 servers on AIX, HP-UX, or Solaris systems to V6.3.4 on Linux in the *Upgrade and Migration Guide for V5 Servers*

Upgrading the Tivoli Storage Manager server

Table 24. Migration information (continued)

To migrate the server from this operating system	To this operating system	See this information
z/OS®	AIX	Section about migrating Tivoli Storage Manager V5 servers on z/OS systems to V6 on AIX or Linux on System z® in the *Upgrade and Migration Guide for V5 Servers*
z/OS	Linux on System z	Section about migrating Tivoli Storage Manager V5 servers on z/OS systems to V6 on AIX or Linux on System z in the *Upgrade and Migration Guide for V5 Servers*

To revert to an earlier version of Tivoli Storage Manager after an upgrade or migration, you must have a full database backup and the installation software for the original server. You must also have key configuration files:

- Volume history file
- Device configuration file
- Server options file
- `dsmserv.dsk` file

Restriction: Multiple server instances on a system all use the same installed code, so all the server instances on a system must be upgraded at the same time.

Upgrading from Tivoli Storage Manager V6.2 to V6.3 or later

You can upgrade the server directly from Tivoli Storage Manager Version 6.2 to V6.3.1, V6.3.2, V6.3.3, or V6.3.4 without installing V6.3 first. You also do not need to uninstall V6.2.

To upgrade to the Tivoli Storage Manager V6.3 or later server, install the V6.3 license package. The license package is provided with the purchase of a base release. Alternatively, you can obtain the license package when you download a fix pack from Passport Advantage, an IBM license acquisition and software maintenance website, at http://www.ibm.com/software/lotus/passportadvantage/pacustomers.html.

Before you upgrade the Tivoli Storage Manager server, ensure that you retain the installation media from the base release of the installed server. If you installed Tivoli Storage Manager from a DVD, ensure that the DVD is available. If you installed Tivoli Storage Manager from a downloaded package, ensure that the downloaded files are available. If the upgrade fails, and the server license module is uninstalled, the installation media from the server base release are required to reinstall the license.

The upgrade process consists of three phases:
1. Planning the upgrade
2. Preparing the system
3. Installing the software and verifying the upgrade

To plan the upgrade, complete the following steps:

1. Optional: To review hardware and software requirements before you start the upgrade process, see the requirements for your operating system:

   "System requirements for the Tivoli Storage Manager server" on page 5

   For the latest updates related to system requirements, see the Tivoli Storage Manager support website at http://www.ibm.com/support/docview.wss?uid=swg21243309.

   Tip: At a later stage in the process, after you extract the installation files, you can run the prerequisite checker to automatically verify hardware and software requirements.

2. For special instructions or specific information for your operating system, review the release notes or readme files: http://publib.boulder.ibm.com/infocenter/tsminfo/v6r3/topic/com.ibm.itsm.relnotes.doc/relnote_server630.html. Alternatively, review the readme file on the Tivoli Storage Manager installation DVD or in the directory where you extract the package.

3. If the server that you are upgrading is at a release level that is earlier than V6.2.3.000, review Technote 1452146 (http://www.ibm.com/support/docview.wss?uid=swg21452146). The technote describes improvements in the database reorganization process, and configuration changes that you might be required to make.

4. Select an appropriate day and time to upgrade your system to minimize the impact on production operations. Upgrading the server from V6.2 to V6.3 or later takes approximately 20 - 50 minutes. Your environment might produce different results from these lab results. The time that is required to update the system depends on the database size and many other factors. When you start the upgrade process, clients cannot connect to the server until the new software is installed and any required licenses are registered again.

To prepare the system for the upgrade, complete the following steps:

1. Log on to the system where you are planning to upgrade the Tivoli Storage Manager server.

   Use the root user ID.

2. Back up the Tivoli Storage Manager database. The preferred method is to use a snapshot backup. A snapshot backup is a full database backup that does not interrupt any scheduled database backups. For example, you can create a backup by issuing the Tivoli Storage Manager administrative command:

   ```
   backup db type=dbsnapshot devclass=tapeclass
   ```

   For more information about this command and other Tivoli Storage Manager administrative commands, see the *Administrator's Reference*.

3. Back up the device configuration information by issuing the Tivoli Storage Manager administrative command:

   ```
   backup devconfig filenames=file_name
   ```

   where *file_name* specifies the name of the file in which to store device configuration information.

4. Back up the volume history file to another directory or rename the file. Issue the Tivoli Storage Manager administrative command:

   ```
   backup volhistory filenames=file_name
   ```

where *file_name* specifies the name of the file in which to store the volume history information.

Important: By taking this step, you ensure that the file is not overwritten during the upgrade process. If you decide to restore the database, this file is required.

5. Save a copy of the server options file, typically named `dsmserv.opt`. The file is in the server instance directory.

6. Back up the deployment engine by issuing the following system commands:
```
. /var/ibm/common/acsi/setenv.sh
cd /usr/ibm/common/acsi/bin
./de_backupdb
```

7. For each existing server instance, gather information about the corresponding DB2 instance. Note the default database path, actual database path, database name, database alias, and any DB2 variables that are configured for the instance. Keep the record for future reference.

   a. Ensure that you are logged on with the instance user ID, and not the root user ID, when you issue the system commands to obtain DB2 instance information.

   b. Obtain a list of DB2 instances by issuing the following system commands:
   ```
   su - instance
   /opt/tivoli/tsm/db2/instance/db2ilist
   ```

   c. Obtain the default database path of the DB2 instance by issuing the following system commands:
   ```
   su - instance
   . ~instance/sqllib/db2profile; LC_ALL=C db2 get dbm cfg | grep DFTDBPATH
   ```

   d. Obtain information about the DB2 instance databases by issuing the following system commands:
   ```
   su - instance
   . ~instance/sqllib/db2profile; LC_ALL=C db2 list database directory
   ```

   e. Obtain the DB2 instance variables by issuing the following system commands:
   ```
   su - instance
   . ~instance/sqllib/db2profile; LC_ALL=C db2set -all
   ```

   f. Obtain more DB2 instance information by saving the following files:
   ```
   ~instance/sqllib/userprofile
   ```
   ```
   ~instance/sqllib/usercshrc
   ```

   For example, issue the following system commands:
   ```
   cp ~instance/sqllib/userprofile copy_location
   ```
   ```
   cp ~instance/sqllib/usercshrc copy_location
   ```

   where *instance* is the DB2 instance and *copy_location* is the location where the copied file is saved.

8. Prevent activity on the server by disabling new sessions. Issue the following Tivoli Storage Manager administrative commands:
```
disable sessions client
disable sessions server
```

9. Prevent administrative activity from any user ID other than the administrator ID that is being used for the upgrade preparation tasks. Lock out other administrator IDs, if necessary, by using the Tivoli Storage Manager administrative command:
```
lock admin administrator_name
```

10. Verify whether any sessions exist, and notify the users that the server will be stopped. To check for existing sessions, issue the following Tivoli Storage Manager administrative command:

    `query session`

11. Cancel sessions that are running by issuing the following Tivoli Storage Manager administrative command:

    `cancel session all`

12. Halt the server by issuing the following Tivoli Storage Manager administrative command:

    `halt`

13. In the server instance directory of your installation, delete or rename the `NODELOCK` file. The `NODELOCK` file contains the previous licensing information for your installation. This licensing information is replaced when the upgrade is complete.

To install the software and verify that the upgrade was successful, complete the following steps:

1. If you are installing the products by using the Tivoli Storage Manager DVD, insert the DVD into a DVD drive.

   Ensure that the DVD is mounted on directory `/dvdrom` and navigate to that directory.

2. If you downloaded the program from Passport Advantage as an executable file, verify that you have enough space to store the installation files when you extract them from the product package. For space requirements, see the download document for your product:

   - Tivoli Storage Manager: http://www.ibm.com/support/docview.wss?uid=swg24030521
   - Tivoli Storage Manager Extended Edition: http://www.ibm.com/support/docview.wss?uid=swg24030527
   - System Storage Archive Manager: http://www.ibm.com/support/docview.wss?uid=swg24030530

3. If you are installing the program from Passport Advantage, ensure that the executable file for the installation package is in the directory where you want the installation package to be. The directory for the installation package must not contain previously extracted files, or any other files.

4. If you downloaded the program from Passport Advantage, navigate to the directory where you placed the executable file and complete the following steps:

   a. Change the file permissions by issuing the following system command:

      `chmod a+x 6.x.x.x-TIV-TSMALL-platform.bin`

      where *6.x.x.x.* specifies the version number and *platform* specifies the architecture that Tivoli Storage Manager is to be installed on.

   b. To extract the installation files, issue the following system command:

      `./6.x.x.x-TIV-TSMALL-platform.bin`

5. To ensure that your system meets all requirements, locate the following file and run it:

   `prereqcheck.bin`

   For details, see "Running the installation prerequisite checker" on page 7.

6. Install the Tivoli Storage Manager software by using one of the following methods:

   Installation wizard

   > The installation wizard guides you through the process with a graphical user interface.

   > For instructions, see "Upgrading Tivoli Storage Manager by using the installation wizard" on page 84

   Console installation wizard

   > The console installation wizard guides you through the process with a text-based interface. You provide input by issuing commands. This option is useful if you are installing Tivoli Storage Manager from a system that does not support a graphical user interface.

   > For instructions, see "Upgrading Tivoli Storage Manager by using the console installation wizard" on page 86

   Silent mode

   > You start the process by specifying the values of variables, and the installation runs on its own. You are freed from the tasks of monitoring the installation and providing input during the process.

   > For instructions, see "Upgrading Tivoli Storage Manager in silent mode" on page 87

   Tip: If you have multiple server instances on your system, run the installation wizard only once. The installation wizard upgrades all server instances. For more information about running multiple servers, see "Running multiple server instances on a single system" on page 64.

7. Correct any errors that are detected during the installation process. Errors are listed in the summary page of the wizard.

   You can also review the error log files in the `/var/tivoli/tsm` directory.

8. Verify that the upgrade was successful:

   a. Start the server instances as described in "Starting the server instance on AIX, HP-UX, Linux, and Solaris systems" on page 59.

   b. Monitor the messages that the server issues as it starts. Watch for error and warning messages, and resolve any issues.

   c. Verify that you can connect to the server by using the administrative client. To start an administrative client session, issue the following Tivoli Storage Manager administrative command:

   ```
   dsmadmc
   ```

   d. Run **QUERY** commands to obtain information about the upgraded system. For example, to obtain consolidated information about the system, issue the following Tivoli Storage Manager administrative command:

   ```
   query system
   ```

   To obtain information about the database, issue the following Tivoli Storage Manager administrative command:

   ```
   query db format=detailed
   ```

9. Register the licenses for the Tivoli Storage Manager server components that are installed on your system by issuing the following Tivoli Storage Manager administrative command:

   ```
   register license file=*.lic
   ```

Restriction: You cannot register licenses for IBM Tivoli Storage Manager for Mail, IBM Tivoli Storage Manager for Databases, IBM Tivoli Storage Manager for Enterprise Resource Planning, and IBM Tivoli Storage Manager for Space Management.

10. Back up the deployment engine again by issuing the following system commands:

```
. /var/ibm/common/acsi/setenv.sh
cd /usr/ibm/common/acsi/bin
./de_backupdb
```

After you upgrade the server to V6.3.3 or later, you can authenticate passwords with the LDAP directory server, or authenticate passwords with the Tivoli Storage Manager server. Passwords that are authenticated with the LDAP directory server can provide enhanced system security. For details, see the section about managing passwords and logon procedures in the *Administrator's Guide*.

Upgrading from Tivoli Storage Manager V6.1 to V6.3 or later

You can upgrade your system directly from Tivoli Storage Manager V6.1 to V6.3.1, V6.3.2, V6.3.3, or V6.3.4 without installing V6.3 first. You also do not need to uninstall V6.1.

To upgrade to the Tivoli Storage Manager V6.3 or later server, install the V6.3 license package. The license package is provided with the purchase of a base release. Alternatively, you can obtain the license package when you download a fix pack from Passport Advantage, an IBM license acquisition and software maintenance website, at http://www.ibm.com/software/lotus/passportadvantage/pacustomers.html.

Before you upgrade the Tivoli Storage Manager server, ensure that you retain the installation media from the base release of the installed server. If you installed Tivoli Storage Manager from a DVD, ensure that the DVD is available. If you installed Tivoli Storage Manager from a downloaded package, ensure that the downloaded files are available. If the upgrade fails, and the server license module is uninstalled, the installation media from the server base release are required to reinstall the license.

The upgrade process consists of three phases:
1. Planning the upgrade
2. Preparing the system
3. Installing the software and verifying the upgrade

To plan the upgrade, complete the following steps:
1. Optional: To review hardware and software requirements before you start the upgrade process, see the requirements for your operating system:

   "System requirements for the Tivoli Storage Manager server" on page 5

   For the latest updates related to system requirements, see the Tivoli Storage Manager support website at http://www.ibm.com/support/docview.wss?uid=swg21243309.

   Tip: At a later stage in the process, after you extract the installation files, you can run the prerequisite checker to automatically verify hardware and software requirements.

2. For special instructions or specific information for your operating system, review the release notes: http://publib.boulder.ibm.com/infocenter/tsminfo/ v6r3/topic/com.ibm.itsm.relnotes.doc/relnote_server630.html. Alternatively, review the readme file on the Tivoli Storage Manager installation DVD or in the directory where you extract the package.

3. If the server that you are upgrading is at a release level earlier than V6.1.5.10, review Technote 1452146 (http://www.ibm.com/support/ docview.wss?uid=swg21452146). The technote describes improvements in the database reorganization process, and configuration changes that you might be required to make.

4. To minimize the impact on production operations, select an appropriate day and time to upgrade your system. Upgrading the server from V6.1 to V6.3 or later takes approximately 20 - 50 minutes. Your environment might produce different results than these lab results. The time that is required to update the system depends on the database size and many other factors. When you start the upgrade process, clients cannot connect to the server until the new software is installed and any required licenses are registered again.

To prepare the system for the upgrade, complete the following steps:

1. Log on to the system where you are planning to upgrade the Tivoli Storage Manager server.

   Use the root user ID.

2. Back up the database. The preferred method is to use a snapshot backup. A snapshot backup is a full database backup that does not interrupt any scheduled database backups. For example, you can create a backup by issuing the Tivoli Storage Manager administrative command:

   ```
   backup db type=dbsnapshot devclass=tapeclass
   ```

   For more information about this command and other Tivoli Storage Manager administrative commands, see the *Administrator's Reference*.

3. Back up the device configuration information by issuing the following Tivoli Storage Manager administrative command:

   ```
   backup devconfig filenames=file_name
   ```

   where *file_name* specifies the name of the file in which to store device configuration information.

4. Back up the volume history file to another directory or rename the file. Issue the following Tivoli Storage Manager administrative command:

   ```
   backup volhistory filenames=file_name
   ```

   where *file_name* specifies the name of the file in which to store the volume history information.

   Important: By taking this step, you ensure that the file is not overwritten during the upgrade process. If you decide to restore the database, this file is required.

5. Save a copy of the server options file, typically named `dsmserv.opt`. The file is in the server instance directory.

6. Back up the deployment engine by issuing the following system commands:

   ```
   . /var/ibm/common/acsi/setenv.sh
   cd /usr/ibm/common/acsi/bin
   ./de_backupdb
   ```

7. Prevent activity on the server by disabling new sessions. Issue the following Tivoli Storage Manager administrative commands:

   ```
   disable sessions client
   disable sessions server
   ```

8. Prevent administrative activity from any user ID other than the administrator ID that is being used to prepare the upgrade. Lock out other administrator IDs, if necessary, by using the Tivoli Storage Manager administrative command:

   ```
   lock admin administrator_name
   ```

9. Verify whether any sessions exist, and notify the users that the server will be stopped. To check for existing sessions, issue the following Tivoli Storage Manager administrative command:

   ```
   query session
   ```

10. Cancel sessions that are running by issuing the following Tivoli Storage Manager administrative command:

    ```
    cancel session all
    ```

11. Halt the server by issuing the following Tivoli Storage Manager administrative command:

    ```
    halt
    ```

12. In the server instance directory of your installation, delete or rename the NODELOCK file. The NODELOCK file contains the previous licensing information for your installation. This licensing information is replaced when the upgrade is complete.

13. For each existing server instance, gather information about the corresponding DB2 instance. Note the default database path, actual database path, database name, database alias, and any DB2 variables that are configured for the instance. Keep the record for future reference.

    a. Ensure that you are logged on with the instance user ID, and not the root user ID, when you issue the system commands to obtain DB2 instance information.

    b. Obtain a list of DB2 instances by issuing the following system commands:

       ```
       su - instance
       /opt/tivoli/tsm/db2/instance/db2ilist
       ```

    c. Obtain the default database path of the DB2 instance by issuing the following system commands:

       ```
       su - instance
       . ~instance/sqllib/db2profile; LC_ALL=C db2 get dbm cfg | grep DFTDBPATH
       ```

    d. Obtain information about the DB2 instance databases by issuing the following system commands:

       ```
       su - instance
       . ~instance/sqllib/db2profile; LC_ALL=C db2 list database directory
       ```

    e. Obtain the DB2 instance variables by issuing the following system commands:

       ```
       su - instance
       . ~instance/sqllib/db2profile; LC_ALL=C db2set -all
       ```

    f. Obtain more DB2 instance information by saving the following files:

       ```
       ~instance/sqllib/userprofile
       ```

       ```
       ~instance/sqllib/usercshrc
       ```

       For example, issue the following system commands:

       ```
       cp ~instance/sqllib/userprofile copy_location
       cp ~instance/sqllib/usercshrc copy_location
       ```

where *instance* is the DB2 instance and *copy_location* is the location where the copied file is saved.

To verify requirements and install the software, complete the following steps:

1. If you downloaded the program from Passport Advantage as an executable file, verify that you have enough space to store the installation files when you extract them from the product package. For space requirements, see the download document for your product:

   - Tivoli Storage Manager: http://www.ibm.com/support/ docview.wss?uid=swg24030521
   - Tivoli Storage Manager Extended Edition: http://www.ibm.com/ support/docview.wss?uid=swg24030527
   - System Storage Archive Manager: http://www.ibm.com/support/ docview.wss?uid=swg24030530

2. If you are installing the program from Passport Advantage, ensure that the executable file for the installation package is in the directory where you want the installation package to be. The directory for the installation package must not contain previously extracted files, or any other files.

3. If you downloaded the program from Passport Advantage, navigate to the directory where you placed the executable file and complete the following steps:

   a. Change the file permissions by issuing the following system command:

      ```
      chmod a+x 6.x.x.x-TIV-TSMALL-platform.bin
      ```

      where *6.x.x.x.* specifies the version number and *platform* specifies the architecture that Tivoli Storage Manager is to be installed on.

   b. To extract the installation files, issue the following system command:

      ```
      ./6.x.x.x-TIV-TSMALL-platform.bin
      ```

      where *6.x.x.x.* specifies the version number and *platform* specifies the architecture that Tivoli Storage Manager is to be installed on.

4. If you are installing the products by using the Tivoli Storage Manager DVD, insert the DVD into a DVD drive.

   Ensure that the DVD is mounted on directory `/dvdrom` and navigate to that directory.

5. To ensure that your system meets all requirements, locate the following file and run it:

   ```
   prereqcheck.bin
   ```

   For details, see "Running the installation prerequisite checker" on page 7.

6. Review the installation methods:

   Installation wizard
   > The installation wizard guides you through the process with a graphical user interface.

   Console installation wizard
   > The console installation wizard guides you through the process with a text-based interface. You provide input by issuing commands. This option is useful if you are installing Tivoli Storage Manager from a system that does not support a graphical user interface.

Silent mode

You start the process by specifying the values of variables, and the installation runs on its own. You are freed from the tasks of monitoring the installation and providing input during the process.

7. If you plan to use the installation wizard or console installation wizard for the upgrade, ensure that the following requirements are met:

- The system must have one of the following protocols enabled. Ensure that the port that the protocol uses is not blocked by a firewall.

    Secure Shell (SSH)

    Ensure that the port is set to the default value, 22. Also, ensure that the SSH daemon service has access rights for connecting to the system by using `localhost`.

    Remote shell (rsh)

    Remote Execution Protocol (REXEC)

- You must be able to log on to the V6.3 or later system with the user ID that you created for the server instance, by using the SSH, rsh, or REXEC protocol. When you use the wizard, use this user ID and password to access that system.

    Tip: If "su" is enabled for the instance owner user ID, the listed requirements are not mandatory.

  If you cannot establish a connection by using the SSH, rsh, or REXEC protocols, manually upgrade the Tivoli Storage Manager server instance from Version 6.1. For details, see http://www.ibm.com/support/docview.wss?uid=swg27018195.

8. Install the Tivoli Storage Manager software by using one of the following methods:

    Installation wizard

    For instructions, see "Upgrading Tivoli Storage Manager by using the installation wizard" on page 84.

    Console installation wizard

    For instructions, see "Upgrading Tivoli Storage Manager by using the console installation wizard" on page 86.

    Silent mode

    For instructions, see "Upgrading Tivoli Storage Manager in silent mode" on page 87.

    Tips: If you have multiple server instances on your system, run the installation wizard only once. The installation wizard upgrades all server instances. For more information about running multiple servers, see "Running multiple server instances on a single system" on page 64. After Tivoli Storage Manager is upgraded, do not configure the system again.

9. Correct any database errors that are detected during the installation process. Review the output from the **db2ckupgrade** command. The log names for each database have the following structure:

    `/tmp/db2ckupgrade_instance_name_db_name.log`

  The wizard automatically corrects some errors in the database during the upgrade to V6.3 or later and DB2 V9.7. You might need to correct other errors manually. For more information about database errors, see the information about DB2 log files in the *Problem Determination Guide*.

10. Correct any other errors that were detected during the installation process. Errors are listed in the summary page of the wizard.

    You can also review the error log files in the `/var/tivoli/tsm` directory.

11. Verify that the upgrade was successful:

    a. Start the server instances as described in "Starting the server instance on AIX, HP-UX, Linux, and Solaris systems" on page 59.

    b. Monitor the messages that the server issues as it starts. Watch for error and warning messages, and resolve any issues.

    c. Verify that you can connect to the server by using the administrative client. To start an administrative client session, issue the following Tivoli Storage Manager administrative command:

       `dsmadmc`

    d. Run **QUERY** commands to obtain information about the upgraded system. For example, to obtain consolidated information about the system, issue the following Tivoli Storage Manager administrative command:

       `query system`

       To obtain information about the database, issue the following Tivoli Storage Manager administrative command:

       `query db format=detailed`

12. Register the licenses for the Tivoli Storage Manager server components that are installed on your system by issuing the following Tivoli Storage Manager administrative command:

    `register license file=*.lic`

    Restriction: You cannot register licenses for IBM Tivoli Storage Manager for Mail, IBM Tivoli Storage Manager for Databases, IBM Tivoli Storage Manager for Enterprise Resource Planning, and IBM Tivoli Storage Manager for Space Management.

13. Back up the deployment engine again by issuing the following system commands:

    ```
    . /var/ibm/common/acsi/setenv.sh
    cd /usr/ibm/common/acsi/bin
    ./de_backupdb
    ```

After you upgrade the server to V6.3.3 or later, you can authenticate passwords with the LDAP directory server, or authenticate passwords with the Tivoli Storage Manager server. Passwords that are authenticated with the LDAP directory server can provide enhanced system security. For details, see the section about managing passwords and logon procedures in the *Administrator's Guide*.

Upgrading Tivoli Storage Manager by using the installation wizard

Using the installation wizard is one method of upgrading Tivoli Storage Manager from Version 6.

See Chapter 5, "Upgrading to Tivoli Storage Manager Version 6.3 or later," on page 73 for an overview of the upgrade steps, before starting the upgrade.

To upgrade Tivoli Storage Manager from Version 6 by using the installation wizard, complete the following steps:

1. If you are installing locally onto a remote system that uses an X display, and your local system does not have an X Window System server running, the installation might fail. If it fails, ensure that the DISPLAY environment variable is *not* set and restart the installation.

2. If your temporary location is smaller than Tivoli Storage Manager needs, as per the system requirements, use the Install Anywhere environment variable `$IATEMPDIR` as the temporary directory.

3. Before installing any Tivoli Storage Manager components, ensure that the `LD_LIBRARY_PATH_64` environment variable is *not* set.

4. To start the wizard without saving your responses, enter the following command:

   `./install.bin`

   To start the wizard and save your responses to later use for a silent installation, enter the following command and specify the -r option.

   `./install.bin -r /`*`path_name`*`/response.rsp`

   where *path_name* is the full directory path to where you want the response file to be created. If you do not specify a fully qualified name, the response file is placed in a temporary directory.

5. Select the language for your installation and follow the wizard, selecting **Next** to step through the wizard.

   Select the product that you are entitled to use and a license agreement is displayed. You can select only one product on the page. If you select Tivoli Storage Manager, Tivoli Storage Manager Extended Edition, or System Storage Archive Manager, you are asked if you will be using LAN-free or library sharing. If you select **YES**, you must accept the Tivoli Storage Manager for Storage Area Networks license agreement. This is in addition to the license for the product that you chose on the previous page.

   Select the components that you want to install. Components include the server, languages, license, device driver, and storage agent. There is no default, so you must make a selection. If you previously installed a server, ensure that you select the same directory when you install a language package, license, or device driver. If you previously installed a storage agent, ensure that you select the same directory if you return to install a device driver.

   A server and a storage agent cannot be installed on the same workstation.

   The Tivoli Storage Manager client application programming interface (API), DB2 Version 9.7, and IBM Global Security Kit (GSKit) Version 8 are automatically installed when you select the server component.

At the end of the upgrade, a summary is provided. If errors occurred during the upgrade, another summary page lists the errors and directs you to an error log file. The installation log is stored in the following location:

   `/var/tivoli/tsm`

Upgrading Tivoli Storage Manager by using the console installation wizard

Using the console installation wizard is one method of upgrading Tivoli Storage Manager from Version 6.

To upgrade the Tivoli Storage Manager server from Version 6 by using the console installation wizard, complete the following steps:

1. If you are installing locally onto a remote system that uses an X display, and your local system does not have an X Window System server running, the installation might fail. If it fails, ensure that the DISPLAY environment variable is *not* set and restart the installation.

2. If your temporary location is smaller than Tivoli Storage Manager needs, as per the system requirements, use the Install Anywhere environment variable `$IATEMPDIR` as the temporary directory.

3. Before installing any Tivoli Storage Manager components, ensure that the `LD_LIBRARY_PATH_64` environment variable is *not* set.

4. To start the wizard without saving your responses, enter the following command:

   `./install.bin -i console`

   To start the wizard and save your responses, enter the following command and specify the -r option.

   `./install.bin -i console -r /path_name/response.rsp`

   where *path_name* is the full directory path to where you want the response file to be created. If you do not specify a fully qualified name, the response file is placed in a temporary directory.

5. Select the language for your installation and follow the wizard, selecting **Next** to step through the wizard.

   Select the product that you are entitled to use and a license agreement is displayed. You can select only one product on the page. If you select Tivoli Storage Manager, Tivoli Storage Manager Extended Edition, or System Storage Archive Manager, you are asked if you will be using LAN-free or library sharing. If you select **YES**, you must accept the Tivoli Storage Manager for Storage Area Networks license agreement. This is in addition to the license for the product that you chose on the previous page.

   Select the components that you want to install. Components include the server, languages, license, device driver, and storage agent. There is no default, so you must make a selection. If you previously installed a server, ensure that you select the same directory when you install a language package, license, or device driver. If you previously installed a storage agent, ensure that you select the same directory if you return to install a device driver.

   A server and a storage agent cannot be installed on the same workstation.

   The Tivoli Storage Manager client application programming interface (API), DB2 Version 9.7, and IBM Global Security Kit (GSKit) Version 8 are automatically installed when you select the server component.

At the end of the upgrade, a summary is provided. If errors occurred during the upgrade, another summary page lists the errors and directs you to an error log file. The installation log is stored in the following location:

```
/var/tivoli/tsm
```

Upgrading Tivoli Storage Manager in silent mode

Using silent mode is one method of upgrading Tivoli Storage Manager from Version 6.

See Chapter 5, "Upgrading to Tivoli Storage Manager Version 6.3 or later," on page 73 for an overview of the upgrade steps, before starting the upgrade.

Pass the variables in Table 25 into this file to define the silent upgrade:

```
./install.bin
```

Table 25. Variables for the silent upgrade

Variable	Description
• -DIBM_TSM_LICENSE_ACCEPTED=true • -DIBM_TSMEE_LICENSE_ACCEPTED=true • -DIBM_SSAM_LICENSE_ACCEPTED=true • -DIBM_TSMSAN_LICENSE_ACCEPTED=true (required)	Specify one or two variables or the installation stops. It also stops if you specify more than two variables. The wizard installs the license agreement for the Tivoli Storage Manager product that is selected. **Tip:** If two products are specified, the wizard checks that one of them is the Tivoli Storage Manager for Storage Area Networks license: IBM_TSMSAN_LICENSE_ACCEPTED=true. If one variable is not, the wizard stops.
For command line: -DINSTANCE_CRED="*instance1 userid1 password1, instance2 userid2 password2*" (required) For response file: INSTANCE_CRED=*instance1 userid1 password1, instance2 userid2 password2* (required)	Enter the instance credentials used by the upgrade wizard to redefine the database instance in an upgrade from V6.1. Use quotation marks around the credentials when you pass them into the command line. Specify multiple instances by separating them with a comma. To find the existing server instances, issue this command: `/opt/tivoli/tsm/db2/instance/db2ilist` **Tip:** An instance cannot be in both the INSTANCE_CRED and the INSTANCE_OMIT parameters. All of the instances that exist when an installation package is upgraded must be listed in either the INSTANCE_CRED or the INSTANCE_OMIT parameters. Or, the silent upgrade fails.

Upgrading the Tivoli Storage Manager server

Table 25. Variables for the silent upgrade (continued)

Variable	Description

For command line:-
`DINSTANCE_OMIT="instance3, instance4"`
(optional)
 	
For response file:
`INSTANCE_OMIT=instance3, instance4`
(optional)
	Enter any instances that will not be recreated as part of the upgrade from V6.1. Use this variable if you have an instance that exists but is not used. Use it if you removed the instance user ID, forgot the password, or otherwise do not want to create the instance as part of an upgrade.
	
	Use quotation marks around the credentials when you pass them into the command line. Specify multiple instances by separating them with a comma.
	Tip: An instance cannot be in both the INSTANCE_CRED and the INSTANCE_OMIT parameters. All of the instances that exist when an installation package is upgraded must be listed in either the INSTANCE_CRED or the INSTANCE_OMIT parameters. Or, the silent upgrade fails.

`-DINSTALL_DEVICES=1` (optional)	Upgrade the Tivoli Storage Manager device driver.
`-DINSTALL_LICENSE=1` (required for base packages)	Upgrade the Tivoli Storage Manager server license component. This variable should be specified only if the package being upgraded includes Tivoli Storage Manager server license files or the installation might fail. This option is typically required only for a first-time upgrade of the base release package. This option should not be used when installing most fix packs and interim fix packages because they do not include the server licenses.
`-DINSTALL_SERVER=1` (optional)	Upgrade the Tivoli Storage Manager server component.
`-DINSTALL_STAGENT=1` (optional)	Upgrade the Tivoli Storage Manager storage agent. A server and a storage agent cannot be installed on the same workstation.

Table 25. Variables for the silent upgrade (continued)

Variable	Description
-DINSTALL_*language_package*=1 (optional)	Upgrade a specific language pack. You can install the following server language-packages during the silent installation, using these variables: • INSTALL_GERMAN • INSTALL_SPANISH • INSTALL_FRENCH • INSTALL_ITALIAN • INSTALL_BRPORTUGUESE • INSTALL_KOREAN • INSTALL_JAPANESE • INSTALL_RUSSIAN • INSTALL_SCHINESE • INSTALL_TCHINESE • INSTALL_ENGLISHUTF8 • INSTALL_GERMANUTF8 • INSTALL_SPANISHUTF8 • INSTALL_FRENCHUTF8 • INSTALL_ITALIANUTF8 • INSTALL_PTBUTF8 • INSTALL_KOREANUTF8 • INSTALL_JAPANESEUTF8 • INSTALL_SCHINESEUTF8 • INSTALL_RUSSIANUTF8 • INSTALL_TCHINESEUTF8 • INSTALL_BIG5CH For example, to install the German language package, use this variable: -DINSTALL_GERMAN=1

- To enable a component during silent upgrade, append it to the **install.bin** command on a single line. For example:

```
./install.bin -i silent
-DIBM_TSM_LICENSE_ACCEPTED=true
-DINSTALL_SERVER=1 -DINSTALL_LICENSE=1
-DINSTALL_ENGLISHUTF8=1
```

- Alternatively, the component variables can be placed into a response file. The path to this response file can then be passed into the `./install.bin` command. To create this file, use the same variables that are in Table 25 on page 87.

  Remove the -D and separate the options on individual lines. Do not use quotation marks. For example:

```
INSTANCE_CRED=tsminst1 tsminst1 tsminst1
INSTANCE_OMIT=tsminst2
IBM_product_LICENSE_ACCEPTED=true
INSTALL_SERVER=1
INSTALL_SPANISH=1
```

- To use an existing response file, issue the following command:

```
./install.bin -i silent -f response_file
```

where the *response_file* is the full directory path to a file that you created in the Tivoli Storage Manager installation process. The response file contains variables that you selected during a prior installation, by using the GUI or console wizard. You might see a difference between response files, depending on which installation mode you used (GUI or console).

Fix any errors before continuing. For more information, review the following log:

```
/var/tivoli/tsm
```

Chapter 6. Reverting from Version 6.3 or later to the previous Version 6 server

If you must revert to the previous version of the server after an upgrade, you must have a full database backup from your original version. You must also have the server installation media for your original version and key configuration files. Carefully follow the preparation steps before you upgrade the server. By doing so, it might be possible to revert to the previous version of the Tivoli Storage Manager server with minimal loss of data.

You must have the following items from the earlier version of the server:
- Server database backup
- Volume history file
- Device configuration file
- Server options file

Use the same instructions whether you are reverting within releases or to an earlier release, for example, from 6.2.2 to 6.2.0 or from 6.2.2 to 6.1.2. The older version must match the version that you used before the upgrade to 6.3 or later.

Attention: Specify the **REUSEDELAY** parameter to help prevent backup-archive client data loss when you revert the server to a previous version.

Steps for reverting to the previous server version

Complete the following steps on the system that has the Version 6.3 or later server.

1. Back up the Version 6.3 or later database. Save the contents of the instance directory, including the volume history file, the device configuration file, and server options file. Keep these files if you want to return to the Version 6.3 or later version of the server.

2. Halt the server to shut down all server operations by using the **HALT** command.

3. Remove the database from the database manager, then delete the database and recovery log directories.

   a. Manually remove the database. One way to remove it is by issuing this command:

      ```
      dsmserv -k instance_name removedb tsmdb1
      ```

   b. If you must reuse the space that is occupied by the database and recovery log directories, you can now delete these directories.

4. Use the uninstallation program to uninstall the Version 6.3 or later server. Uninstallation removes the server and the database manager, with their directories. For details, see Chapter 8, "Uninstalling Tivoli Storage Manager," on page 99.

5. Reinstall the version of the server program that you were using before the upgrade to Version 6.3 or later. This version must match the version that your server was running when you created the database backup that you restore in a later step. For example, the server was at version 6.2.2.0 before the upgrade, and you intend to use the database backup that was in use on this server. You must install the 6.2.2.0 fix pack to be able to restore the database backup.

6. Copy the following files to the instance directory.

- Device configuration file
- Volume history file
- The server options file (typically `dsmserv.opt`)

7. If you are reverting to a version at or earlier than 6.1.2, complete the following steps.

    a. Locate the instance file:

        /etc/tivoli/tsm/instance.info

    b. Recreate each of the instances in the instance file by issuing the **db2icrt** command:

        /opt/tivoli/tsm/db2/instance/db2icrt -a server -u
        InstanceName InstanceName

    c. Recreate the variables in the instance file by issuing the **db2set -i** command. Issue this command for each variable in your instance file. Ensure that the variable is in quotation marks:

        /opt/tivoli/tsm/db2/instance/db2set –i *InstanceName* "*Variable*"

8. Format the database by using the **DSMSERV FORMAT** utility. For details, see the information for the version of the server that you are reinstalling.

    Information for Version 6.2 is available at this information center: http://pic.dhe.ibm.com/infocenter/tsminfo/v6r2.

    Information for Version 6.1 is available at this information center: http://publib.boulder.ibm.com/infocenter/tsminfo/v6.

9. Restore the database to a point in time before the upgrade. For more details, see the restoring the server database to a point in time section in the *Administrator's Guide*.

10. If you enabled data deduplication for any FILE-type storage pools that existed before the upgrade, or if you moved data that existed before the upgrade into new storage pools while using the Version 6.3 or later server, you must complete additional recovery steps. For more details, see "Additional recovery steps if you created new storage pools or enabled data deduplication" on page 93.

11. If the **REUSEDELAY** parameter setting on storage pools is less than the age of the database that you restored, restore volumes on any sequential-access storage pools that were reclaimed after that database backup. Use the **RESTORE VOLUME** command.

    If you do not have a backup of a storage pool, audit the reclaimed volumes by using the **AUDIT VOLUME** command, with the **FIX=YES** parameter to resolve inconsistencies. For example:

        audit volume *volume_name* fix=yes

12. If client backup or archive operations were completed using the Version 6.3 or later server, audit the storage pool volumes on which the data was stored.

13. If you were using active-data pools before you upgraded to Version 6.3 or later, you must recreate them.

    The amount of time required to recreate the active-data pools might be significant, depending on the number and size of the active-data pools to be recreated.

Additional recovery steps if you created new storage pools or enabled data deduplication

If you created new storage pools, turned on data deduplication for any FILE-type storage pools, or did both while your server was running as a Version 6.3 or later server, you must complete more steps to return to the previous server version.

To complete this task, you must have a complete backup of the storage pool that was created before the upgrade to Version 6.3 or later.

Use this information if you did either or both of the following actions while your server was running as a Version 6.3 or later server:

- You enabled the data deduplication function for any storage pools that existed before the upgrade to Version 6.3 or later program. Data deduplication applies only to storage pools that use a FILE device type.
- You created new, primary storage pools after the upgrade, *and* moved data that was stored in other storage pools into the new storage pools.

Perform these steps after the server is again restored to V6.1 or V6.2.

- For each storage pool for which you enabled the data deduplication function, restore the entire storage pool by using the **RESTORE STGPOOL** command.
- For storage pools that you created after the upgrade, determine what action to take. Data that was moved from existing, V6.1 or V6.2 storage pools into the new storage pools might be lost because the new storage pools no longer exist in your restored V6.1 or V6.2 server. Possible recovery depends on the type of storage pool:
  - If data was moved from V6.1 or V6.2 DISK-type storage pools into a new storage pool, space that was occupied by the data that was moved was probably reused. Therefore, you must restore the original, V6.1 or V6.2 storage pools, by using the storage pool backups that were created before the upgrade to Version 6.3 or later.

    If *no* data was moved from V6.1 or V6.2 DISK-type storage pools into a new storage pool, then audit the storage pool volumes in these DISK-type storage pools.
  - If data was moved from V6.1 or V6.2 sequential-access storage pools into a new storage pool, that data might still exist and be usable in storage pool volumes on the restored V6.1 or V6.2 server. The data might be usable if the **REUSEDELAY** parameter for the storage pool was set to a value that prevented reclamation while the server was running as a Version 6.3 or later server. If any volumes were reclaimed while the server was running as a Version 6.3 or later server, restore those volumes from storage pool backups that were created before the upgrade to Version 6.3 or later.

Chapter 7. Reference: DB2 commands for Tivoli Storage Manager server databases

Use this list as reference when you are directed to issue DB2 commands by IBM support.

Purpose

After using the wizards to install and configure Tivoli Storage Manager, you seldom need to issue DB2 commands. A limited set of DB2 commands that you might use or be asked to issue are listed in Table 26. This list is supplemental material only and is not a comprehensive list. There is no implication that a Tivoli Storage Manager administrator will use it on a daily or ongoing basis. Samples of some commands are provided. Details of output are not listed.

For a full explanation of the commands described here and of their syntax, see http://pic.dhe.ibm.com/infocenter/db2luw/v9r7.

Table 26. DB2 commands

Command	Description	Example

`db2icrt`	Creates DB2 instances in the home directory of the instance owner.
	Tip: The Tivoli Storage Manager configuration wizard creates the instance used by the server and database. After a server is installed and configured through the configuration wizard, the **db2icrt** command is generally not used.
	
	This utility is in the `DB2DIR/instance` directory, where DB2DIR represents the installation location where the current version of the DB2 database system is installed.
		Manually create a Tivoli Storage Manager instance. Enter the command on one line:
		`/opt/tivoli/tsm/db2/instance/`
		`db2icrt -a server -s ese -u`
		`instance_name instance_name`

`db2osconf`	Checks the settings of the kernel configuration parameters and suggests updates to improve performance. The suggested updates provided by the **db2osconf** utility are the minimum settings required to run DB2 on your system.	Retrieve a list of currently supported options: `db2osconf`
`db2set`	Displays DB2 variables.	List DB2 variables: `db2set`
`CATALOG DATABASE`	Stores database location information in the system database directory. The database can be located either on the local workstation or on a remote database partition server. The server configuration wizard takes care of any catalog needed for using the server database. Run this command manually, after a server is configured and running, only if something in the environment changes or is damaged.	Catalog the database: `db2 catalog database tsmdb1`
`CONNECT TO DATABASE`	Connects to a specified database for command-line interface (CLI) use.	Connect to the Tivoli Storage Manager database from a DB2 CLI: `db2 connect to tsmdb1`

Reference: DB2 commands for Tivoli Storage Manager server databases

Table 26. DB2 commands (continued)

Command	Description	Example

`GET DATABASE CONFIGURATION`	Returns the values of individual entries in a specific database configuration file. **Important:** This command and parameters are set and managed directly by DB2. They are listed here for informational purposes and a means to view the existing settings. Changing these settings might be advised by IBM support or through service bulletins such as APARs or Technical Guidance documents (technotes). Do not change these settings manually. Change them only at the direction of IBM and only through the use of Tivoli Storage Manager server commands or procedures.	Show the configuration information for a database alias:
		`db2 get db cfg for tsmdb1`
		
		Retrieve information in order to verify settings such as database configuration, log mode, and maintenance.
		`db2 get db config for tsmdb1`
		`show detail`

`GET DATABASE MANAGER CONFIGURATION`	Returns the values of individual entries in a specific database configuration file. **Important:** This command and parameters are set and managed directly by DB2. They are listed here for informational purposes and a means to view the existing settings. Changing these settings might be advised by IBM support or through service bulletins such as APARs or Technical Guidance documents (technotes). Do not change these settings manually. Change them only at the direction of IBM and only through the use of Tivoli Storage Manager server commands or procedures.	Retrieve configuration information for the database manager: `db2 get dbm cfg`

`GET HEALTH SNAPSHOT`	Retrieves the health status information for the database manager and its databases. The information returned represents a snapshot of the health state at the time the command was issued. Tivoli Storage Manager monitors the state of the database using the health snapshot and other mechanisms that are provided by DB2. There might be cases where the health snapshot or other DB2 documentation indicates that an item or database resource might be in an alert state. Such a case indicates that action must be considered to remedy the situation. Tivoli Storage Manager monitors the condition and responds appropriately. Not all declared alerts by the DB2 database are acted on.	Receive a report on DB2 health monitor indicators:
		`db2 get health snapshot for`
		`database on tsmdb1`

`GRANT (Database Authorities)`	Grants authorities that apply to the entire database rather than privileges that apply to specific objects within the database.	Grant access to the user ID itmuser:
		`db2 GRANT CONNECT ON DATABASE`
		`TO USER itmuser`
		`db2 GRANT CREATETAB ON DATABASE`
		`TO USER itmuser`

Table 26. DB2 commands (continued)

Command	Description	Example
RUNSTATS	Updates statistics about the characteristics of a table and associated indexes or statistical views. These characteristics include number of records, number of pages, and average record length. To see a table, issue this utility after updating or reorganizing the table. A view must be enabled for optimization before its statistics can be used to optimize a query. A view that is enabled for optimization is known as a statistical view. Use the DB2 **ALTER VIEW** statement to enable a view for optimization. Issue the **RUNSTATS** utility when changes to underlying tables substantially affect the rows returned by the view. **Tip:** The server configures DB2 to run the **RUNSTATS** command as needed.	Update statistics on a single table. `db2 runstats on table SCHEMA_NAME.TABLE_NAME with distribution and sampled detailed indexes all`
SET SCHEMA	Changes the value of the **CURRENT SCHEMA** special register, in preparation for issuing SQL commands directly through the DB2 CLI. **Tip:** A special register is a storage area that is defined for an application process by the database manager. It is used to store information that can be referenced in SQL statements.	Set the schema for Tivoli Storage Manager: `db2 set schema tsmdb1`
START DATABASE MANAGER	Starts the current database manager instance background processes. The Tivoli Storage Manager server starts and stops the instance and database whenever the server starts and halts. **Important:** Allow the Tivoli Storage Manager server to manage the starting and stopping of the instance and database unless otherwise directed by IBM support.	Start the database manager: `db2start`
STOP DATABASE MANAGER	Stops the current database manager instance. Unless explicitly stopped, the database manager continues to be active. This command does not stop the database manager instance if any applications are connected to databases. If there are no database connections, but there are instance attachments, the command forces the instance attachments to stop first. Then, it stops the database manager. This command also deactivates any outstanding database activations before stopping the database manager. This command is not valid on a client. The Tivoli Storage Manager server starts and stops the instance and database whenever the server starts and halts. **Important:** Allow the Tivoli Storage Manager server to manage the starting and stopping of the instance and database unless otherwise directed by IBM support.	Stop the database manager: `db2 stop dbm`

Chapter 8. Uninstalling Tivoli Storage Manager

You can use the following procedures to uninstall Tivoli Storage Manager. Before you remove Tivoli Storage Manager, there are several steps to complete to ensure that you do not lose your backup and archive data.

Complete the following steps before you uninstall Tivoli Storage Manager:
- Complete a full database backup.
- Save a copy of the volume history and device configuration files.
- Store the output volumes in a safe location.

Important: Uninstalling Tivoli Storage Manager removes all components of the Tivoli Storage Manager server Version 6.3 or later. It is not possible to uninstall a single component of the product by itself. For example, you cannot uninstall only the Tivoli Storage Manager device driver and leave the Tivoli Storage Manager server.

To uninstall Tivoli Storage Manager, complete the following steps:
1. Change to the following directory: /opt/tivoli/tsm/_uninst by issuing this command:

   cd /opt/tivoli/tsm/_uninst
2. Use one of the following methods to uninstall Tivoli Storage Manager:
   - To use the installation wizard (GUI) to uninstall Tivoli Storage Manager, issue this command:

     ./Uninstall_Tivoli_Storage_Manager
   - To use the console to uninstall Tivoli Storage Manager, issue this command:

     ./Uninstall_Tivoli_Storage_Manager -i console
   - To silently uninstall Tivoli Storage Manager, issue this command:

     ./Uninstall_Tivoli_Storage_Manager -i silent
3. Follow the prompts to uninstall Tivoli Storage Manager.
4. You see a message that the Tivoli Storage Manager uninstallation was successful.

See Chapter 2, "Installing the Tivoli Storage Manager server components," on page 29 for installation steps to reinstall the Tivoli Storage Manager components.

Uninstalling and reinstalling Tivoli Storage Manager

If you plan to manually reinstall Tivoli Storage Manager instead of using the wizard, there are a number of steps to take to preserve your server instance names and database directories. During an uninstallation, any server instances you had set up are removed, but the database catalogs for those instances still exist.

If you are using the wizard to upgrade from Tivoli Storage Manager Version 6.1 or Version 6.2, it is not necessary to complete these steps, the wizard completes them automatically. To manually uninstall and reinstall Tivoli Storage Manager complete the following steps:
1. Make a list of your current server instances before proceeding to the uninstallation. Run the following command:

Uninstalling Tivoli Storage Manager

```
/opt/tivoli/tsm/db2/instance/db2ilist
```

2. Run the following commands for every server instance:

```
db2 attach to instance_name
db2 get dbm cfg show detail
db2 detach
```

Keep a record of the database path for each instance.

3. Uninstall Tivoli Storage Manager. See Chapter 8, "Uninstalling Tivoli Storage Manager," on page 99.

4. When you uninstall any version of Tivoli Storage Manager 6.1 or later, including a fix pack, an instance file is created. The instance file is created to help reinstall Tivoli Storage Manager. Check this file and use the information when you are prompted for the instance credentials when reinstalling. In silent installation mode, you provide these credentials using the INSTANCE_CRED variable.

   You can find the instance file in the following location:

```
/etc/tivoli/tsm/instance.info
```

5. Reinstall Tivoli Storage Manager. See Chapter 2, "Installing the Tivoli Storage Manager server components," on page 29.

6. Recreate your server instances. See "Creating the server instance" on page 50.

   Tip: The installation wizard configures the server instances but you must verify that they exist. If they do not exist, you must manually configure them.

7. Catalog the database. Log in to each server instance as the instance user, one at a time, and issue the following commands:

```
db2 catalog database tsmdb1
db2 attach to instance_name
db2 update dbm cfg using dftdbpath instance_directory
db2 detach
```

8. Verify that the server instance was created successfully. Issue this command:

```
/opt/tivoli/tsm/db2/instance/db2ilist
```

9. Verify that Tivoli Storage Manager recognizes the server instance by listing your directories. Your home directory appears if you did not change it. Your instance directory does appear if you used the configuration wizard. Issue this command:

```
db2 list database directory
```

   If you see TSMDB1 listed, you can start the server.

Part 2. Installing and upgrading Tivoli Monitoring for Tivoli Storage Manager

IBM Tivoli Monitoring for Tivoli Storage Manager brings together multiple components to monitor Tivoli Storage Manager servers, and to produce historical reports about server and client activities.

Chapter 9. Collecting, monitoring, and reporting data

You cannot install Tivoli Monitoring for Tivoli Storage Manager, or create an agent instance on an HP-UX or Solaris system. However, you can create an agent instance on an AIX, Linux, or Windows system and monitor aTivoli Storage Manager server that is running on an HP-UX or Solaris operating system.

For more information about installing Tivoli Monitoring for Tivoli Storage Manager see the section on Installing and upgrading Tivoli Monitoring for Tivoli Storage Manager in the *Tivoli Storage Manager Installation Guide.*

For more information about monitoring your HP-UX or Solaris system see the section on reporting and monitoring by using Tivoli Monitoring for Tivoli Storage Manager, in the *Tivoli Storage Manager Installation Guide.*

For more information about Cognos® reports, see the Cognos section in the *Tivoli Storage Manager Installation Guide.*

Creating and configuring an agent instance on a Windows Tivoli Monitoring server

To collect historical data or monitor real-time information, you must create and configure a Tivoli Monitoring for Tivoli Storage Manager agent instance on an IBM Tivoli Monitoring server.

You cannot install Tivoli Monitoring for Tivoli Storage Manager directly on a Tivoli Storage Manager server. But you can create a monitoring agent instance for the server on an AIX, Linux, or Windows IBM Tivoli Monitoring server to collect and view data.

Create and configure an instance of the Tivoli Monitoring for Tivoli Storage Manager agent on the IBM Tivoli Monitoring server, where you installed Tivoli Monitoring for Tivoli Storage Manager.

This agent monitors your Oracle Solaris system and stores the historical and real-time information in the Tivoli Data Warehouse. Use the following method for each system that you want to monitor:

1. On the Tivoli Monitoring server, click **Start** > **All Programs** > **IBM Tivoli Monitoring** > **Manage Tivoli Monitoring Services**.
2. In the Manage Tivoli Enterprise Monitoring Services - TEMS Mode window, double-click **Monitoring Agent for Tivoli Storage Manager template.**
3. In the Input window, specify the instance name and click **OK**. For example, inst1.
4. In the Agent Configuration window, complete the following fields for the Tivoli Storage Manager server to be monitored:
   a. In the **Server Address** field, enter the server address for the Tivoli Storage Manager.
   b. In the **Port Number** field, enter the port number that is used to communicate with the Tivoli Storage Manager server.
   c. In the **TSM Administrator** field, enter the Tivoli Storage Manager administrator ID that is used to access the server.

Note: The IBM Tivoli Monitoring agent runs only queries on the Tivoli Storage Manager server and does not change anything. The administrator that you choose to run the queries can be an administrator ID without the following privileges:

- System Privileges
- Policy Privileges
- Storage Privileges
- Operator Privileges
- Client Access Privileges
- Client Owner Privileges

    d. In the **TSM Administrator Password** field, enter the password, twice for the Tivoli Storage Manager administrator ID.

    e. Click **OK** to save the settings.

       The Manage Tivoli Enterprise Monitoring Services page opens with the new Tivoli Monitoring for Tivoli Storage Manager agent instance. **Task/Subsystem** has the unique instance name for the agent that you configured.

5. Start the Tivoli Monitoring for Tivoli Storage Manager agent instance by completing one of the following tasks:

- In the Manage Tivoli Enterprise Monitoring Services window, select the Tivoli Monitoring for Tivoli Storage Manager agent that you want to start and click the green light icon in the toolbar at the top of the window.
- If you do not have the toolbar enabled, double-click the Tivoli Monitoring for Tivoli Storage Manager agent instance in the list. This toggles the **service/application** field to **Stopped** or **Started** status.

Creating and configuring an agent instance using CandleManage

To collect historical data or monitor real-time information, you must manually create and configure a Tivoli Monitoring for Tivoli Storage Manager agent instance on an IBM Tivoli Monitoring server using the CandleManage program.

You cannot install Tivoli Monitoring for Tivoli Storage Manager directly on a Tivoli Storage Manager server. But you can create a monitoring agent instance for the server on an AIX, Linux, or Windows IBM Tivoli Monitoring server to collect and view data.

Create and configure an instance of the Tivoli Monitoring for Tivoli Storage Manager agent on the IBM Tivoli Monitoring server, where you installed Tivoli Monitoring for Tivoli Storage Manager.

This agent monitors your Oracle Solaris system and stores the historical and real-time information in the Tivoli Data Warehouse. Use the following method for each system that you want to monitor:

1. Run the CandleManage program using the following command:

    a. Go to the directory where the CandleManage program is located by issuing the following command:

```
cd /opt/tivoli/tsm/reporting/itm/bin
```

    b. Run the CandleManage program by issuing this command:

```
/opt/IBM/ITM/bin/CandleManage
```

2. In the CandleManage window, right-click **Monitoring Agent for Tivoli Storage Manager**, and select **Configure** to create a new instance of the Tivoli Monitoring for Tivoli Storage Manager agent.

3. In the Manage Application Instances window, click **Add instance**.

4. In the Input window, enter the instance name and click **OK**.

5. In the Agent Configuration window, complete the following fields for the server to be monitored:

   a. In the **Server Address** field, enter the fully qualified IP server address for the Tivoli Storage Manager.

   b. In the **Port Number** field, enter the port number that is used to communicate with the server.

   c. In the **Administrator** field, enter the administrator ID that is used to access the server.

      Note: The IBM Tivoli Monitoring agent runs only queries on the Tivoli Storage Manager server and does not change anything. The administrator that you choose to run the queries can be an administrator ID without the following privileges:
      - System Privileges
      - Policy Privileges
      - Storage Privileges
      - Operator Privileges
      - Client Access Privileges
      - Client Owner Privileges

   d. In the **Administrator Password** field, enter the password, twice for the Tivoli Storage Manager administrator ID.

   e. Click **OK** to save the settings.

      The Manage Tivoli Enterprise Monitoring Services page opens with the new Tivoli Monitoring for Tivoli Storage Manager agent instance.
      Task/Subsystem has the unique instance name for the agent that you configured.

6. In the Manage Tivoli Enterprise Monitoring Services window, to start the Tivoli Monitoring for Tivoli Storage Manager agent instance, complete one of the following tasks:

   - Select the Tivoli Monitoring for Tivoli Storage Manager agent that you want to start and click the green light icon in the tool bar at the top of the window.

   - If you do not have the tool bar enabled, double-click the monitoring agent instance in the list. This toggles the **service** or **application** value to **Stopped** or **Started** status.

Creating and configuring an agent instance using the command-line interface

In order to collect historical reporting information or monitor real-time information, you must manually create and configure a Tivoli Monitoring for Tivoli Storage Manager agent instance on an IBM Tivoli Monitoring server.

The term, *monitoring agent*, that is displayed in the following examples is synonymous with the monitoring agent.

You cannot install Tivoli Monitoring for Tivoli Storage Manager directly on a Tivoli Storage Manager server. But you can create a monitoring agent instance for the server on an AIX, Linux, or Windows IBM Tivoli Monitoring server to collect and view data.

Create and configure an instance of the Tivoli Monitoring for Tivoli Storage Manager agent on the IBM Tivoli Monitoring server, where you installed Tivoli Monitoring for Tivoli Storage Manager.

This agent monitors your Oracle Solaris system and stores the historical and real-time information in the Tivoli Data Warehouse. Use the following method for each system that you want to monitor:

1. Run the following command from the `/opt/Tivoli/TSM/Reporting/itm/bin` directory, where `/opt/Tivoli/TSM/Reporting/` is the default directory where you installed the Tivoli Monitoring for Tivoli Storage Manager agent on the IBM Tivoli Monitoring server:

   ```
   itmcmd config -A -t sk
   ```

   The command returns the following instruction:

   ```
   Enter the instance name
   ```

2. Enter a name for the Tivoli Monitoring for Tivoli Storage Manager agent instance, for example:

   ```
   myinstance
   ```

   The command returns the following question:

   ```
   Edit "Monitoring Agent for Tivoli Storage Manager" settings?
   [ 1=Yes, 2=No ] (default is: 1): ss2.storage.tucson.ibm.com
   ```

3. Enter 1. The command returns the following question:

   ```
   Edit 'TSM Server Connection Information' settings? [ 1=Yes, 2=No ] (default is: 1):
   ```

4. Enter 1. The command returns the following prompt for your input:

   ```
   Server Address (default is: ):
   Port Number (default is: 1500):
   TSM Administrator (default is: ):
   TSM Administrator Password (default is: ):
   ```

5. Enter the following values for the Tivoli Storage Manager server to be monitored:

   a. For the `Server Address`, enter the server address.

   b. For the `Port Number`, accept the default or enter another port number.

c. For the `TSM Administrator ID`, enter the Tivoli Storage Manager administrator ID to access the server.

   Note: The IBM Tivoli Monitoring agent runs only queries on the Tivoli Storage Manager server and does not change anything. The administrator that you choose to run the queries can be an administrator ID without the following privileges:
   - System Privileges
   - Policy Privileges
   - Storage Privileges
   - Operator Privileges
   - Client Access Privileges
   - Client Owner Privileges

d. For the `TSM Administrator Password`, enter the password for the Tivoli Storage Manager administrator ID.

The command returns the following question:

```
Will this agent connect to a TEMS?
[1=YES, 2=NO] (Default is: 1):
```

6. Enter 1. The command returns the following prompts, for your input:

```
TEMS Host Name (Default is: sysback):
Network Protocol [ip, sna, ip.pipe or ip.spipe] (Default is: ip.pipe):
     Now choose the next protocol number from one of these:
     - ip
     - sna
     - ip.spipe
     - 0 for none
Network Protocol 2 (Default is: 0):
IP.PIPE Port Number (Default is: 1918):
Enter name of KDC_PARTITION (Default is: null):
```

7. Enter a protocol name or enter the default `ip.pipe`. The command returns the following information:

```
Configure connection for a secondary TEMS? [1=YES, 2=NO] (Default is: 2):
```

8. To have this Tivoli Monitoring for Tivoli Storage Manager agent connect to another Tivoli Enterprise monitoring server, enter 1. Otherwise, go to step 10

   If you entered 1 to connect to another server, the command returns the following information:

```
Enter Optional Primary Network Name or 0 for "none" (Default is: 0):
```

9. Enter a network name or 0. If you do not enter a value, no optional primary network name is created. The command returns the following information:

```
Agent configuration completed...
```

10. Enter the following command to start the Tivoli Monitoring for Tivoli Storage Manager agent instance that you configured in step 3 on page 106.

   ```
   # itmcmd agent -o myinstance start sk
   ```

   If successful, the command returns the following information:

```
Starting Reporting Agent for Tivoli Storage Manager
 Agent Started Successfully
```

If there is a problem with the Tivoli Monitoring for Tivoli Storage Manager
agent instance starting, the command returns the following information:

```
Starting Monitoring Agent for Tivoli Storage Manager ...
KCIIN0198E Unable to start agent. Please, check log file.
# exit
```

Part 3. Installing and upgrading the Administration Center

Use the Administration Center to administer Tivoli Storage Manager and Tivoli Monitoring for Tivoli Storage Manager from a supported browser anywhere in your network.

Chapter 10. Installing and configuring the Administration Center

Use the Administration Center to administer Tivoli Storage Manager and Tivoli Monitoring for Tivoli Storage Manager from a supported browser anywhere in your network.

A standard installation without Tivoli Common Reporting takes approximately 35 minutes. If you install the Tivoli Common Reporting feature, the installation takes approximately 90 minutes. The installation time depends on the speed of your processor and the memory that is available in your system.

Important: The deployment engine is automatically installed with the Administration Center. Do not uninstall the deployment engine. Uninstalling this component can cause problems when upgrading the Administration Center.

If you are upgrading the Administration Center, see Chapter 12, "Upgrading the Administration Center to Version 6.3 or later," on page 135.

Use the following steps to install the Administration Center and other components, including Tivoli Integrated Portal:

1. Download and install the Administration Center. See "Installing the Administration Center components" on page 120.
2. Optional: Configure a Lightweight Directory Access Protocol (LDAP) server. See "Configuring LDAP user authentication" on page 125.
3. Verify the Administration Center installation. See "Verifying the Administration Center installation" on page 130.
4. Start the Tivoli Integrated Portal. See "Starting and stopping the Tivoli Integrated Portal server" on page 129.
5. Define your Tivoli Integrated Portal users. See "Defining Administration Center users to the Tivoli Integrated Portal" on page 131.
6. Add connections for the Tivoli Storage Manager servers that you want to manage. See "Defining Administration Center users to the Tivoli Integrated Portal" on page 131.
7. Set session length and Java heap size. See "Estimating Java heap memory size" on page 116.

Related tasks:

Chapter 12, "Upgrading the Administration Center to Version 6.3 or later," on page 135

Planning to install the Administration Center

To administer servers from a browser, plan to install the Administration Center.

Ensure that you review all applicable planning information, including system requirements, capacity planning, and installation scenarios.

Before you install the software, complete these tasks:
1. Read the system requirements that are required for your operating system.
2. Review the capacity planning information.
3. Choose an installation scenario that best suits your needs.
4. Review the installation worksheet and note the user IDs, passwords, and other values that are required during installation.
5. Optionally, run the prerequisite checker to verify the readiness of your installation environment.

System requirements

The Tivoli Storage Manager server can require a large amount of memory, network bandwidth, and processor resources. In many 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, it can support both applications.

If you plan to use the Administration Center to manage an environment with many servers or administrators, consider installing the Administration Center on a separate system. See the capacity planning section.

For Administration Center system requirements, see the following website: http://www.ibm.com/support/docview.wss?uid=swg21515628.

You can install the Administration Center Version 6.3 and later on the following platform:
• Solaris SPARC (64-bit)

The optional Tivoli Common Reporting feature cannot be used with the Solaris operating system.

Administration Center capacity planning

Capacity planning is important in determining the setup of your environment. For large environments, you can estimate how many Tivoli Storage Manager Administration Center servers are required to support administrators and Tivoli Storage Manager servers.

With this information, you can allocate sufficient resources to meet the peak application demands with little or no performance degradation and loss of function. If the Administration Center server shares a system with other applications, add the processing and memory requirements of those applications to the Administration Center requirements. In this way, you can determine the total system requirements.

Tip: The Tivoli Storage Manager Administration Center Capacity Planner tool can simplify issuing capacity planning equations. It can provide recommendations for Administration Center hardware sizings. See your IBM representative to obtain this

tool.

Maximum number of active administrators

It is possible to define many administrators to one Administration Center, however, the number of administrators who are active at the same time is limited.

An administrative task is best thought of as an interaction within the administration interface that produces some usable information or completes a preferred operation.

The maximum number of administrators who are logged in and conducting administrative tasks at a certain time for one Administration Center instance is limited. If too many administrators are logged in to the Administration Center at the same time, it is likely to result in an unacceptable rate of task failures and lost administrator productivity.

More administrators can likely be logged in at the same time if they run just a few tasks. For example, if more than 16 administrators are logged in at the same time, three or four, non-concurrent tasks per hour are possible. If the needs of your business require that several administrators be logged in at the same time, completing many tasks, plan for multiple Administration Center instances.

Processing capacity

You can meet high performance requirements for an Administration Center by using a dual-processor system with a speed of 3 GHz or faster.

The Administration Center server can use more processors, but there might not be a noticeable effect on the application performance. Adjust the processor utilization further by multiplying by the ratio of 3.4 GHz relative to the planned processor speed. Then, multiply by the ratio of two processors to the planned number of processors.

To help with planning your sizing, you can estimate the Administration Center processor utilization by using the following equation:

```
processor utilization (%) = 0.15 + tasks completed (per hour) * 0.006
```

The tasks that are completed per hour rate is the highest total number of tasks per hour that is expected to be run with or on the Administration Center server. It includes tasks that are run by all administrators who are logged in at the time. If only one administrator is logged in, the number of tasks that are run per hour can be 20 - 100. This number is not to exceed 2850 tasks per hour.

I/O throughput

Administration Center disk and network input/output (I/O) requirements are not particularly demanding, so there is no need for sustained high I/O throughput.

Application response time suffers if network delays or disk I/O delays occur. A low latency network provides the best administrator response time. Networks that are poorly tuned, currently saturated by other applications, or with higher latency (WANs) might significantly affect Administration Center performance.

Processing memory

The most important resource requirement for the Administration Center is memory.

The Administration Center uses significant memory. The memory is based on the number of Tivoli Storage Manager servers or libraries that are controlled in the Administration Center, and the number of the other applications, such as Tivoli Common Reporting.

The Administration Center uses Java. To increase memory in Java, set a higher value for the Java heap size. A heap is a stack of data that tracks memory allocations. The Java heap size determines how much memory can be allocated to a particular Java Runtime Environment.

The maximum Java heap size is the value that is specified for the Administration Center server. The default is 512 MB. The largest value that can be configured for the maximum Java heap size is 1536 MB.

Add the additional memory that is required by the operating system to the memory required by any other applications on the Administration Center server. Configure the server with at least this much real memory. It is important that the required real memory is available. Without adequate real memory, significant response time degradation can occur as the result of system memory paging.

Minimizing memory usage

You can take steps to keep the Administration Center server memory available for those users and tasks that need it the most.

For the best results, complete these configuration items:
- Turn off all Administration Center server traces, except as needed for problem determination.
- Do not increase the Tivoli Integrated Portal session timeout above 30 minutes. Idle sessions can hold on to large amounts of memory until the session is canceled because of the timeout. To configure the session timeout, see "Configuring the session timeout period" on page 115.

You also achieve better results by completing the following operational tasks regularly:
- Close portlet pages when you are finished. Closing the pages frees up any memory that is held by those pages.
- Use available filtering options where provided when you view data in large tables. The additional search criteria reduces the amount of data that the Administration Center receives from the Tivoli Storage Manager server. It also reduces the amount of data that is sent to the browser and the amount of memory required.

Configuring the session timeout period:

Configure the Administration Center session timeout period by using the Administration Center Support Utility.

This utility is located in the IBM Tivoli Storage Manager installation directory under *install_root*\tsmac\bin. Run the supportUtil script from a command window and follow the instructions.

Start the tool by issuing: supportUtil.sh.

The following text is an example of the output:

```
User ID: iscadmin
Password: <enter password>

Administration Center Support Utility - Main Menu
=================================================
1.  Manage Administration Center tracing
2.  Manage the maximum memory size the Administration Center can use
3.  Manage the Administration Center session timeout setting
4.  Collect trace files, logs and system information to send to support
5.  Generate a heap dump of the Java virtual machine
6.  Generate a Java core dump of the Java virtual machine
7.  View the log file for this utility
9.  Exit
Enter Selection: 3

Administration Center Support Utility - Manage the Session
==========================================================
1.  Update the Administration Center session timeout setting
2.  View the Administration Center session timeout setting
99. Return to main menu
Enter Selection: 1

The session timeout setting determines how long a session can be idle before
it times out. After a timeout occurs the user must log in again. The default
timeout setting is 30 minutes. The minimum timeout setting is 10 minutes. To
cancel this operation enter an empty value.
Enter the new session timeout (minutes): 30
Updating the session timeout to 30 minutes.........
Session timeout successfully updated. Restart ISC for changes to take effect.
Press Enter to continue . . .<return>

Administration Center Support Utility - Manage the Session
==========================================================
1.  Update the Administration Center session timeout setting
2.  View the Administration Center session timeout setting
99. Return to main menu  Enter Selection: 99

Administration Center Support Utility - Main Menu
=================================================
1.  Manage Administration Center tracing
2.  Manage the maximum memory size the Administration Center can use
3.  Manage the Administration Center session timeout setting
4.  Collect trace files, logs and system information to send to support
5.  Generate a heap dump of the Java virtual machine
6.  Generate a Java core dump of the Java virtual machine
7.  View the log file for this utility
9.  Exit  Enter Selection: 2

Administration Center Support Utility - Manage the JVM
======================================================
1.  Update the maximum memory size the Administration Center can use
2.  View the maximum memory size the Administration Center can use
99. Return to main menu
Enter Selection: 1
```

```
The maximum memory size determines the largest amount of memory that can be
used by the Administration Center. A minimum heap size of 512 MB is
recommended. When used by 10 or more users, the recommendation is at least
1024 MB. To cancel this operation enter an empty value.
Enter the new JVM max memory size (MB): 1536
Updating the maximum memory size to 1536 MB......
Maximum memory size successfully updated.
Press Enter to continue . . .<return>
```

Estimating Java heap memory size

The Administration Center maintains information for each active administrative session as a set of objects in the configured Java heap memory. The memory requirements of an administrative session depend on the activities that the administrator runs during the session.

In the browser, each open page requires memory. Each open table requires more memory. The amount of memory depends on the number of rows and columns in the table.

Estimate the Administration Center Java heap size by issuing the following equation:

```
JavaHeapAllocated (MB) = 206 + ActiveAdmins * 30
```

`ActiveAdmins` is the maximum number of administrators who are logged in at one time. Additional administrators can be defined in the IBM Tivoli Integrated Portal, but if they are not logged in, no additional memory is required. The number of Tivoli Storage Manager server connections that are defined by an administrator in the Administration Center is not an important variable in determining the Java heap size requirements. More servers, however, imply that more actual work might be required. A larger maximum Java heap size provides more memory in the case of unexpected administration activity or workload growth. More real memory would be required as well.

Using a maximum Java heap size that is too small for the amount of work that is run in the Administration Center can affect performance. The Java Virtual Machine (JVM) completes garbage collection more frequently, there is higher processor utilization, and slower application response time. In certain conditions, the application is unable to complete the requested action because of memory allocation failure. It then becomes necessary to free up memory by closing work pages or logging out sessions.

Suggestions for reducing administrator session memory requirements include:

- Close work pages as soon as you are finished with them.
- Log out if you are not using any administrative functions for more than 30 minutes.
- Do not set the session timeout period to more than 30 minutes.

Configuring the maximum memory size (Java heap size):

Configure the Administration Center maximum memory size (Java heap size) by using the Administration Center Support Utility.

This utility is located in the IBM Tivoli Storage Manager installation directory under *install_root*\tsmac\bin. Run the supportUtil script from a command window and follow the instructions.

Start the tool by issuing: supportUtil.sh.

The following text is an example of the output:

```
User ID: iscadmin
Password: <enter password>

Administration Center Support Utility - Main Menu
=================================================
1.  Manage Administration Center tracing
2.  Manage the maximum memory size the Administration Center can use
3.  Manage the Administration Center session timeout setting
4.  Collect trace files, logs and system information to send to support
5.  Generate a heap dump of the Java virtual machine
6.  Generate a Java core dump of the Java virtual machine
7.  View the log file for this utility
9.  Exit
Enter Selection: 3

Administration Center Support Utility - Manage the Session
==========================================================
1.  Update the Administration Center session timeout setting
2.  View the Administration Center session timeout setting
99. Return to main menu
Enter Selection: 1

The session timeout setting determines how long a session can be idle before
it times out. After a timeout occurs the user must log in again. The default
timeout setting is 30 minutes. The minimum timeout setting is 10 minutes. To
cancel this operation enter an empty value.
Enter the new session timeout (minutes): 30
Updating the session timeout to 30 minutes........
Session timeout successfully updated. Restart ISC for changes to take effect.
Press Enter to continue . . .<return>

Administration Center Support Utility - Manage the Session
==========================================================
1.  Update the Administration Center session timeout setting
2.  View the Administration Center session timeout setting
99. Return to main menu  Enter Selection: 99

Administration Center Support Utility - Main Menu
=================================================
1.  Manage Administration Center tracing
2.  Manage the maximum memory size the Administration Center can use
3.  Manage the Administration Center session timeout setting
4.  Collect trace files, logs and system information to send to support
5.  Generate a heap dump of the Java virtual machine
6.  Generate a Java core dump of the Java virtual machine
7.  View the log file for this utility
9.  Exit  Enter Selection: 2

Administration Center Support Utility - Manage the JVM
======================================================
1.  Update the maximum memory size the Administration Center can use
2.  View the maximum memory size the Administration Center can use
99. Return to main menu
Enter Selection: 1
```

```
The maximum memory size determines the largest amount of memory that can be
used by the Administration Center. A minimum heap size of 512 MB is
recommended. When used by 10 or more users, the recommendation is at least
1024 MB. To cancel this operation enter an empty value.
Enter the new JVM max memory size (MB): 1536
Updating the maximum memory size to 1536 MB......
Maximum memory size successfully updated.
Press Enter to continue . . .<return>
```

Remember: Do not configure the maximum memory size (Java heap size) to be greater than the available real system memory, or significant performance degradation might occur.

Choosing a location for the Administration Center

Where you install your Administration Center can affect its performance.

During administration activities, more network traffic occurs between the Administration Center system and the administrator's browser than between the Administration Center system and a Tivoli Storage Manager server. Therefore, install the Administration Center close, in network topology, to the administrators, rather than close to the Tivoli Storage Manager servers. For example, if you are in Chicago and administer Tivoli Storage Manager servers in Los Angeles, Paris, and Tokyo, install the Administration Center in Chicago.

You can use a single Administration Center installation to administer multiple Tivoli Storage Manager servers. For availability reasons, you might prefer to install multiple Administration Center instances.

Consider the following statements to further determine where you can install the Administration Center.

You must install the Administration Center on a different system from the Tivoli Storage Manager server if one or more of the following conditions are true:

- The Administration Center is to be used with multiple Tivoli Storage Manager servers and administrators
- Your Tivoli Storage Manager server is large and heavily active.
- The Administration Center is to be used on a heavily active system.

Worksheet for planning details for the Administration Center

Use this worksheet to record information that you need to install the Administration Center.

Item	Description	Default value	Your value
Installation location	Specify the base directory path for the installation. Subdirectories are automatically created for the Administration Center itself, the Tivoli Integrated Portal application, and other components. You can create a new directory or install into an existing Tivoli Integrated Portal instance.	/opt/IBM/tivoli	

Item	Description	Default value	Your value
Tivoli Integrated Portal Migration	When upgrading from version 6.2.x, and earlier, you have the option to migrate your existing Tivoli Integrated Portal settings. These settings include information like server connections and Administration Center preferences. If you are also installing the Tivoli Common Reporting component, your configuration settings will be migrated.	No	
Upgrade	If the installer detects an earlier version of 6.3 on your system, you have the option of installing into an existing Tivoli Integrated Portal or to create a new instance. **Note:** When upgrading from version 6.2.x, and earlier, the Administration Center is installed as a new instance. Previous instances can be removed.	Install into an existing Tivoli Integrated Portal	
Tivoli Common Reporting	Use this optional feature to view historical reports for your Tivoli Storage Manager environment. **Tip:** To upgrade an existing Tivoli Common Reporting installation to the current version, select the following wizard options: • Install Tivoli Common Reporting	Tivoli Common Reporting is not installed	
Cognos port number	If you install Tivoli Common Reporting, you must specify a port number for the IBM Cognos Content Database. The IBM Congos Content Database is a relational database that contains data that IBM Cognos 8 needs to operate, such as report specifications, connection information for data sources, and information about scheduling and emailing reports.	Port number: 1527	
Client Performance Monitor	Use the Client Performance Monitor to view and analyze performance data for client backup and restore operations. The *time interval* setting specifies how long state information is kept for ongoing client operations. The *operation save time* setting specifies how long operational data is kept for historical reporting. **Tip:** To use this feature, some additional parameters must be specified in the client options file. For more information, see the *Using the Application Programming Interface* publication.	Port number: 5129 Time interval: 24 hours Operation save time: 14 days	
Administrator account information	Create the user account that is used to manage access to the Administration Center. For example, you can log on with this user ID to create and manage additional administrative user accounts. **Tip:** If you are installing into an existing Tivoli Integrated Portal instance, you must specify an existing user account that has the iscadmins role assigned. For a new installation, you must also specify the port number that is used to access the Administration Center through a web browser.	Port number: 16310 Password: No default value User ID: tipadmin	

Installation directories

Administration Center components are installed into several directories. The components include Websphere, Tivoli Integrated Portal, Tivoli Common Reporting, and Administration Center.

The default installation directory for the Administration Center is: /opt/IBM/tivoli. It contains the following directories:
- WebSphere (/opt/IBM/tivoli/tipv2)
- Tivoli Integrated Portal (/opt/IBM/tivoli/tipv2)
- Administration Center (/opt/IBM/tivoli/tsmac)

Installing the Administration Center components

To install the Administration Center components, you can use the graphical installation wizard, the console wizard, or the command line in silent mode.

Install the Tivoli Storage Manager Administration Center, using the installation software. The client performance monitor is installed as part of the Administration Center and more information about this is available within the Administration Center.

Restriction: If access rights for deployment engine files are set to single user mode, you cannot install the Administration Center on the same system by using a non-root user ID. If single user mode is specified, install the Administration Center by logging in as the root user or modify the access rights for deployment engine files. For details, see "Configuring access rights to deployment engine files" on page 59.

1. Log in with a user account that has the required directory access permissions. For more information, see "Preparing the Administration Center environment" on page 121.
2. If you are installing the Administration Center using the DVD, complete the following steps:

   Insert the Tivoli Storage Manager Administration Center DVD into a DVD drive. Ensure that the DVD is mounted on directory /dvdrom and change to that directory.
3. If you are installing the Administration Center from the Tivoli Storage Manager FTP downloads site, obtain the package file here: ftp://public.dhe.ibm.com/ storage/tivoli-storage-management/maintenance/admincenter/. Change to the directory where you placed the executable file and complete the following steps:

   Important: The files are extracted to the current directory. Ensure that the executable file is in an empty directory. Do not extract the files into a directory where another Administration Center installation package or any other files are located.

   a. Change file permissions by entering the following command:
      ```
      chmod a+x 6.3.3.0-TIV-TSMAC-platform.bin
      ```

      where *platform* denotes the architecture that the Administration Center is to be installed on.
   b. Run the following command to extract the installation files:

```
./6.3.3.0-TIV-TSMAC-platform.bin
```

4. Optional: After all the files are extracted, locate this file and run it to ensure that your system meets all requirements:

   prereqcheck.bin

   See "Running the installation prerequisite checker" on page 7 for details.

5. If you changed the default, ensure that the following command is enabled so that the Tivoli Storage Manager wizards work properly.

   logins

6. Ensure that there are no processes using *install_dir*/tipv2/java. To check, issue this command:

   ```
   ps -ef | grep install_dir/tipv2/java
   ```

7. Select one of the following ways to install the Administration Center:

   Installation wizard
   "Installing the Administration Center using the installation wizard" on page 122

   Command-line console wizard
   "Installing the Administration Center using the console installation wizard" on page 124

   Silent mode
   "Installing the Administration Center in silent mode" on page 125

8. After installing the Administration Center, configure and customize it for your use.

Preparing the Administration Center environment

Prepare the environment to install the Administration Center with a non-root user account, which is the standard way to complete the installation.

Use a non-root user account for the installation if the components that are being installed might later be integrated with other Tivoli applications within the same Tivoli Integrated Portal instance. You can use a root account for the installation, but doing so can limit future integration options. Also, if you use a root account, you will be unable to start the Administration Center or Tivoli Common Reporting, using a non-root user account.

Restriction: If you use a non-root user account for the installation, you must use the same user account to install future fix packs or upgrades. If you use a non-root user account for the installation, it is possible to use a root user to start the Administration Center and Tivoli Common Reporting. A non-root user, however, cannot be used again without changing authorities of the file system to non-root.

Complete the following steps to prepare for a non-root installation:
1. Log in using the root user ID and password.
2. If necessary, create a new non-root user account. For example, issue the appropriate **useradd** command for your operating system.
3. If the following directory structure does not already exist, create the directories:

   /usr/ibm

   /var/ibm

   /var/tivoli

/opt/IBM/tivoli (This is the default Administration Center installation directory. You can specify a different directory during the installation process.)

Running the installation prerequisite checker

The installation prerequisite checker is an optional tool that verifies the operating system, the amount of free disk space for the installation, and other prerequisites.

To ensure that your system environment is appropriate for the installation, you can run the prerequisite checker before each installation.

Tip: The prerequisite checker verifies only the minimum memory that is necessary. More memory is required for additional tasks.

The prerequisite checker presents a summary of results at the end of the check. Any changes that are required in your environment before the installation are listed. Any new directories that are required for the installation are created.

To run the prerequisite checker, complete the following steps.

1. Ensure that the appropriate installation package is downloaded and that its files are extracted. A prerequisite checker is part of the installation package.
2. Choose the graphical interface (the default) or console method to start the installation, and follow the wizard instructions to complete the installation:
   - Issue this command to start the installation wizard using a graphical interface:

     ./prereqcheck.bin
   - Issue this command to start the installation wizard using the console method:

     ./prereqcheck.bin -i console
3. Select the language for the prerequisite checker user interface.
4. In the welcome and disclaimer panels, review the statements and accept them.

If the Prerequisite Results page indicates that your system passed the checks, you are ready to start the installation.

If an error message is shown in the Prerequisite Results page, make the required corrections before continuing with the installation. The summary page lists the errors and directs you to an error log file.

Installing the Administration Center using the installation wizard

Using the installation wizard is one method of installing the Administration Center.

To install the Administration Center using the installation wizard, complete the following steps:

1. Grant the required directory access permissions.

   For example, issue the following commands to enable the *ac_installer* user account to install the Administration Center using the default installation directory:

   chown -R *ac_installer* /usr/ibm
   chown -R *ac_installer* /var/ibm
   chown -R *ac_installer* /var/tivoli
   chown -R *ac_installer* /opt/IBM/tivoli

Tip: The non-root user account must also have read and write access to the
`/tmp` directory.

2. Verify that the operating system is set to the language that you require. By
   default, the language of the operating system will be the language of the
   Administration Center and its installation wizard.

   If you plan to select a different language for the wizard, you might have to
   change the language of the operating system. By setting the operating system
   to an ASCII language, such as English or Spanish, you can select an ASCII
   language for the wizard later in the installation process. By setting the
   operating system to a non-ASCII language, such as Simplified Chinese, you can
   select a non-ASCII language later in the installation process.

   For information about setting the language of the operating system, see the
   operating system documentation.

3. If you are installing locally onto a remote system that uses an X display, and
   your local system does not have an X Window System server running, the
   installation might fail. If it fails, ensure that the DISPLAY environment variable
   is *not* set and restart the installation.

4. Before installing any Tivoli Storage Manager components, ensure that the
   `LD_LIBRARY_PATH_64` environment variable is *not* set.

5. To start the wizard, enter the following command:

   `./install.bin`

   The Administration Center installation wizard starts.

6. Select the language for your installation and follow the prompts. Tivoli
   Integrated Portal, the Administration Center, and the Client Performance
   Monitor are installed by default.

   The default Tivoli Integrated Portal user name is `tipadmin`. You must specify a
   password for this ID, or for a new ID you create. You use the ID and password
   later to log on to the Tivoli Integrated Portal and the Administration Center.

   Important: Save the user name and password or you are unable to uninstall
   the Administration Center. Refer to the Worksheet for planning details for the
   Administration Center to record the username and password.

At the end of the installation, a summary is provided. Make a note of the port
number that is listed in the summary panel. It might be different from the one that
you entered in the wizard, depending on port availability and your system
requirements. You need this port to log on to the Administration Center.

Tip: A file named `Tivoli_Storage_Manager_Administration_Center.htm` is created
in the `tsmac` directory of the Administration Center installation directory. Open this
file in a web browser to automatically connect to the Administration Center.

If there are any errors during the installation, another summary page lists the
errors and directs you to an error log file. The installation log is in the following
location:

   `/var/tivoli/tsm`.

To change the language of the Administration Center, change the language of the
web browser. For a list of available languages for the Administration Center, see
"Server language locales" on page 38.

Installing the Administration Center using the console installation wizard

Using the console installation wizard is one method of installing the Administration Center.

To install the Administration Center using the console installation wizard, complete these steps:

1. Grant the required directory access permissions.

   For example, issue the following commands to enable the *ac_installer* user account to install the Administration Center using the default installation directory:

   ```
   chown -R ac_installer /usr/ibm
   chown -R ac_installer /var/ibm
   chown -R ac_installer /var/tivoli
   chown -R ac_installer /opt/IBM/tivoli
   ```

   Tip: The non-root user account must also have read and write access to the /tmp directory.

2. Verify that the operating system is set to the language that you require. By default, the language of the operating system will be the language of the Administration Center and its installation wizard.

   If you plan to select a different language for the wizard, you might have to change the language of the operating system. By setting the operating system to an ASCII language, such as English or Spanish, you can select an ASCII language for the wizard later in the installation process. By setting the operating system to a non-ASCII language, such as Simplified Chinese, you can select a non-ASCII language later in the installation process.

   For information about setting the language of the operating system, see the operating system documentation.

3. If you are installing locally onto a remote system that uses an X display, and your local system does not have an X Window System server running, the installation might fail. If it fails, ensure that the DISPLAY environment variable is *not* set and restart the installation.

4. Before installing any Tivoli Storage Manager components, ensure that the LD_LIBRARY_PATH_64 environment variable is *not* set.

5. To start the wizard, enter this command:

   ```
   ./install.bin -i console
   ```

6. Select the language for your installation and follow the prompts. Tivoli Integrated Portal, the Administration Center, and the Client Performance Monitor are installed by default.

   The default Tivoli Integrated Portal user name is tipadmin. You must specify a password for this ID, or for a new ID you create. You use the ID and password later to log on to the Tivoli Integrated Portal and the Administration Center.

   Important: Save the user name and password or you are unable to uninstall the Administration Center. Refer to the Worksheet for planning details for the Administration Center to record the username and password.

At the end of the installation, a summary is provided. Make a note of the port number that is listed in the summary panel. It might be different from the one that you entered in the wizard, depending on port availability and your system requirements. You need this port to log on to the Administration Center.

Tip: A file named `Tivoli_Storage_Manager_Administration_Center.htm` is created in the `tsmac` directory of the Administration Center installation directory. Open this file in a web browser to automatically connect to the Administration Center.

If there are any errors during the installation, another summary page lists the errors and directs you to an error log file. The installation log is in the following location:

`/var/tivoli/tsm`.

To change the language of the Administration Center, change the language of the web browser. For a list of available languages for the Administration Center, see "Server language locales" on page 38.

Installing the Administration Center in silent mode

Use the silent installation option to automatically install the Administration Center and the optional Tivoli Common Reporting feature without any user interaction.

To run a silent installation, complete the following steps:

1. Create a response file. A sample response file named `sample_response.txt` is located in the Tivoli Storage Manager installation media root directory. Use this sample file as a template to create your response file.
2. To start a silent installation, enter the following command on a single line:

   `./install.bin -i silent -f full_path_name_to_response_file`

If there are any errors during the installation, another summary page lists the errors and directs you to an error log file. The installation log is in the following location:

`/var/tivoli/tsm`.

Taking the first steps after you install the Administration Center

After installing the Administration Center, prepare for the post-installation tasks. These tasks include verifying the installation and starting the Administration Center.

Configure the Administration Center by completing the following tasks:

Configuring LDAP user authentication

To use a Lightweight Directory Access Protocol (LDAP) server to authenticate access to the Administration Center, you must complete some additional configuration tasks after you install the Administration Center.

Tips:
- If you use a non-root user account to install the Administration Center, you must manually start the Tivoli Integrated Portal server after you complete the installation. For more information, see "Starting and stopping the Tivoli Integrated Portal server" on page 129.
- Before you change the user authentication method, you must import the Secure Sockets Layer (SSL) certificate. For more information, see Configuring an SSL connection to an LDAP server.

To change the user authentication method from the local operating system to LDAP federated repositories, complete the following steps:

Installing and configuring the Administration Center

1. Open a web browser and log on to the Administration Center with a user account that has administrator privileges. To ensure that you are viewing all of the available tasks, click the **View** list in the upper left corner of the page and select **All tasks**.

2. Click **Settings** > **WebSphere Administrative Console** > **Launch WebSphere administrative console**.

3. In the WebSphere administrative console window, click **Security** > **Global security**.

4. From the **Available realm definitions** list, select **Federated Repositories** and click **Configure**.

5. Under **Related Items**, click **Manage repositories**.

6. Add the LDAP repository that you want to use for authentication by clicking **Add** and entering the following parameters:

   Repository identifier
   > A unique identifier for the repository within the cell, for example: LDAP1.

   Directory type
   > The type of server that you want to connect to.

   Primary host name
   > The host name of the primary LDAP server. This host name is either an IP address or a domain name service (DNS) name.

   Port The LDAP server port. The default value is 389, which is not a Secure Sockets Layer (SSL) connection. Port 636 can be an SSL connection. For some LDAP servers, you can specify a different port for non-SSL and SSL connections. If you do not know the port to use, contact your LDAP server administrator.

   Bind distinguish name
   > The distinguished name (DN) for the application server to use when binding to the LDAP repository. If no name is specified, the application server binds anonymously. In most cases, bind DN and bind password are needed. However, when anonymous bind can satisfy all of the required functions, bind DN and bind password are unnecessary.

   Bind password
   > The password that the application server uses when binding to the LDAP repository.

7. Click **OK**.

8. In the message box, click **Save directly to the master configuration**.

9. In the repository identifier column, click the identifier for the repository that you want to use.

10. On the configuration panel, under **Additional Properties**, click the LDAP entity types.

11. In the **Entity Type** column, click the link for Group, OrgContainer, and PersonAccount. Complete the search bases field. The search bases field specifies the search bases that are used to search this entity type. The search bases specified must be subtrees of the base entry in the repository. The following example search bases have o=ibm,c=us as the base entry in the repository:

    o=ibm,c=us or cn=users,o=ibm,c=us or ou=austin,o=ibm,c=us

You can use a semicolon to delimit the search bases. For example:

`ou=austin,o=ibm,c=us;ou=raleigh,o=ibm,c=us`

12. Click **OK** and then click **Save to the master configuration**. You must save to the master configuration every time that you update the search bases field.

13. Return to the federated repositories page and click **Supported Entity Types** under **Additional Properties**.

14. In the **Entity type** column, click the link for Group, OrgContainer, and PersonAccount and complete the base entry for the default parent and **Relative Distinguished Name** properties fields.

    a. In the Base entry for the default parent field, enter the same value that you entered in the Search bases field in step 11 on page 126.

    b. In the **Relative Distinguished Name** properties field, enter the appropriate LDAP attribute name. In most cases, the values for this field are cn for Group, o;ou;dc;cn for OrgContainer, and uid for PersonAccount.

15. Click **OK** and then click **Save to the master configuration**. You must save to the master configuration every time that you update the base entry for the default parent field.

16. Return to the federated repositories page and click **Apply**, then click **Save to the master configuration**.

17. Under **Repositories in the realm**, click **Add base entry to Realm**.

18. On the repository reference page, select the repository that you created in step 6 on page 126 from the repository list.

19. Enter the distinguished name of a base entry that uniquely identifies the repository in the realm. You must enter the information in the **Distinguished name of a base entry uniquely identifying this set of entries in the realm** field. In most instances, this value is the same value that you entered in the **Search bases** field in step 11 on page 126.

20. In the **Distinguished name of a base entry in this repository** field, enter the distinguished name of the base entry within the repository. In most instances, this value is the same value that you entered in the **Distinguished name of a base entry that uniquely identifies this set of entries in the realm** field.

21. Click **OK** and then click **Save to the master configuration**. You must save to the master configuration every time that you update the distinguished name of a base entry. The base entry identifies the set of entries in the realm field. Two repositories are displayed under repositories in the realm on the federated repositories page: the repository you added, and a default repository.

22. Change the realm name or leave the value in the **Realm name** field as it is.

23. In the primary administrative user name field, enter the name of a user that you added in the repository. The named user is granted administrative privileges for the Tivoli Integrated Portal server.

24. Click the server identity that is stored in the repository.

25. In the server user ID or the administrative user node field, enter the ID that you entered in the primary administrative user name field. Enter the password for the user ID.

26. Select the default file repository that shows **File** in the **Repository type** column and remove it.

27. Click **OK** and then click **Save to the master configuration**.

28. Return to the secure administration, applications, and infrastructure page.

29. In the available realm definition list, select **Federated repositories** and click **Set as current**.

30. Click **Apply** and then click **Save to the master configuration**.
31. Stop and restart the Tivoli Integrated Portal server.

Configuring an SSL connection to an LDAP server

Your implementation of Tivoli Integrated Portal might use an external LDAP-based user repository. You can configure the Tivoli Integrated Portal to communicate over a secure sockets layer (SSL) channel.

This task assumes that you have an existing connection to an LDAP server setup.

Your LDAP server (for example, an IBM Tivoli Directory Server), must be configured to accept SSL connections and run on a secured port number (636). Refer to your LDAP server documentation if you must create a trusted certificate. The trusted certificate must be imported from your LDAP server into the Tivoli Integrated Portal Server key database file (`cert.kdb`).

Complete these steps to configure the Tivoli Integrated Portal Server to communicate over a secure SSL channel with an external LDAP server. All application server instances must be configured for the LDAP server.

1. Log in to the portal.
2. Follow these steps to import your LDAP server's trusted certificate into the application server key database file.
   a. Click **Settings** > **Websphere Administrative Console**. Click **Launch Websphere administrative console**.
   b. Click **Security** > **SSL certificate and key management**.
   c. In the Related Items area, click **Key stores and certificates**.
   d. In the table, click **NodeDefaultTrustStore**.
   e. In the Additional Properties area, click **Signer certificates** link.
   f. Click **Retrieve from port**.
   g. In the relevant fields, provide the host name, the port, the SSL configuration details, and the alias of the certificate for your LDAP server and click **Retrieve signer information**. Then, click **OK**.
3. Complete the following steps to enable SSL communications to your LDAP server:
   a. Click **Security** > **Secure administration, applications, and infrastructure**.
   b. Select **Federated repositories** from the **Available realm definitions** menu list and click **Configure**.
   c. Select your LDAP server from the **Repository** menu list.
   d. Enable the **Require SSL communications** check box and the select the **Centrally managed** option.
   e. Click **OK**.
4. For the changes to take effect, save, stop, and restart all Tivoli Integrated Portal Server instances.

Starting and stopping the Tivoli Integrated Portal server

Depending on your operating system, you might need to manually start the Tivoli Integrated Portal.

If you use a root user account to install the Administration Center, the IBM Tivoli Integrated Portal server starts automatically. If you use a non-root user account for the installation or if you later shut down the system, you must manually start the Tivoli Integrated Portal server.

To manually start or stop the Tivoli Integrated Portal server, use a Tivoli Storage Manager administrative user ID that is defined to the Tivoli Integrated Portal. The administrative user ID must have the `iscadmins` role assigned. For details, see "Defining Administration Center users to the Tivoli Integrated Portal" on page 131.

Use the command line to start and stop Tivoli Integrated Portal servers.

When you start and stop the Tivoli Integrated Portal using the command line, the variables in the commands have these meanings:

- *TIP_HOME* is the Tivoli Integrated Portal installation directory.

    The default for *TIP_HOME* is `/opt/IBM/tivoli/tipv2`.
- *TCR_HOME* is the Tivoli Common Reporting installation directory.

    The default for TCR_HOME is `/opt/IBM/tivoli/tipv2Components/ TCRComponent`.
- *tip_admin* is the administrator user ID for the Administration Center.
- *tip_pw* is the password for the administrator.
- *tip_profile* is the DB2 profile name for the administrator. The default is `TIPProfile`, as provided by Tivoli Integrated Portal.

Start or stop the Tivoli Integrated Portal server by using one of the following methods.

If Tivoli Common Reporting is installed:
Change to the *TCR_HOME*`/bin` directory and issue one of the following commands:

- To start Tivoli Common Reporting and the Tivoli Integrated Portal server, issue this command:

    `./startTCRserver.sh`
- To stop Tivoli Common Reporting and the Tivoli Integrated Portal server, issue this command:

    `./stopTCRserver.sh` *tip_admin tip_pw*

If Tivoli Common Reporting is not installed:
Change to the *TIP_HOME*`/bin` directory and issue one of the following commands:

- To start a Tivoli Integrated Portal server, issue this command:

    `./startServer.sh server1`
- To stop a Tivoli Integrated Portal server, issue the following command on a single line:

    `./stopServer.sh server1 -username` *tip_admin* `-password` *tip_pw*
    `-profileName` *tip_profile*

Verifying the Administration Center installation

After you install the Administration Center, verify the installation by opening the Administration Center and logging in.

Complete the following steps:

1. If you used a non-root user account to install the Administration Center, start the Tivoli Integrated Portal server. For more information, see "Starting and stopping the Tivoli Integrated Portal server" on page 129.

2. Open the Administration Center by entering one of the following addresses in a supported web browser:

```
http://workstation_name:non_secure_port/ibm/console
```

Or:

```
https://workstation_name:secure_port/ibm/console
```

The *workstation_name* is the network name or IP address of the computer on which you installed the Administration Center. The *non_secure_port* is the HTTP port and the *secure_port* is the HTTPS port.

Attention: Use the port number that was shown in the summary panel of the installation wizard, which might be different from the port that you specified in the wizard. If you use an incorrect port, no warning messages are shown but you are not able to complete all Administration Center tasks.

The default HTTP port is 16310. The default HTTPS port is 16311. If you use a different port number from the default, the secure port typically appears as the non-secure port plus 1.

Look in the following file to see the port that is being used. In this file, `WC_defaulthost` contains the value for the HTTP port and `WC_adminhost_secure` contains the value for the HTTPS port.

`TIP_HOME/properties/TIPPortDef.properties`

where *TIP_HOME* is the home directory for the Tivoli Integrated Portal installation.

The default for *TIP_HOME* is `/opt/IBM/tivoli/tipv2`.

Tips:

- If you use `http://workstation_name:16310/ibm/console` to connect to the Administration Center, you are automatically redirected to the secure port and address.
- A file named `Tivoli_Storage_Manager_Administration_Center.htm` is created in the `tsmac` directory of the Administration Center installation directory. Open this file in a web browser to automatically connect to the Administration Center.

3. To get started, log in using the Tivoli Integrated Portal user ID and password that you created during the Administration Center installation. Save this password in a safe location because it is also needed to uninstall the Administration Center.

4. After you successfully log in, the Tivoli Integrated Portal welcome page is shown. 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.

Defining Administration Center users to the Tivoli Integrated Portal

When you install the Administration Center, you must define the users to the Tivoli Integrated Portal.

You can create a separate Tivoli Integrated Portal user ID for each Tivoli Storage Manager administrator, or for a group of administrators. Give each Tivoli Storage Manager administrator their own Tivoli Integrated Portal administrator ID. Creating separate Tivoli Integrated Portal administrator IDs can help you control access for administrators who manage different servers, or have different privilege classes. After logging in using this ID, they can use their Tivoli Storage Manager administrator name and password to manage connections for the servers they manage.

Complete the following steps to define Administration Center users to the Tivoli Integrated Portal:

1. In the navigation tree, expand **Users and Groups**.
2. Click **Manage Users**.
3. Click **Create**.
4. Click **Group Membership**.
5. Select **Group name**, then click **Search**.
6. Add TSM_AdminCenter to the Current groups list.

   Tip: To add the appropriate roles for users to access the Tivoli Common Reporting reports, see ../com.ibm.itsm.tshoot.doc/ ts_pdg_no_existing_group.dita.

7. Click **Close**. The TSM_AdminCenter group is a shell for you to populate with users. You must manually enter the user credentials.
8. To ensure that an administrative user ID can start or stop the Tivoli Integrated Portal server, assign the `iscadmins` role to the administrative user ID.
9. Complete the form and click **Create**.

Resetting the Tivoli Integrated Portal installation wizard password

When the Tivoli Integrated Portal installation wizard password is unknown, you can reset it.

When you upgrade or uninstall the Administration Center, you need to use the *tipadmin* password. If the password is unknown, you must reset it.

Complete the following steps to reset the *tipadmin* password:

1. Log in to the operating system where the Administration Center is installed.
2. Open a command window and go to the `tip_home`\profiles\TIPProfile\bin directory.

   The default *tip_home* is /opt/ibm/tivoli/tipv2.
3. To access the wsadmin prompt, issue the following command:

   `./wsadmin -conntype none -profileName TIPProfile`

4. From the wsadmin command prompt, issue the following three commands to reset the password.

   ```
   wsadmin>$AdminTask changeFileRegistryAccountPassword {-userId username
   -password newpassword}
   wsadmin>$AdminConfig save
   wsadmin>exit
   ```

   The *username* is **tipadmin** and the *newpassword* is the new password you want to use for the tipadmin user ID.

5. For the new password to be recognized, you must restart the Tivoli Integrated Portal server. Go to the *tip_home*\profiles\TIPProfile\bin directory and issue the **stopServer** and **startServer** commands:

   ```
   ./stopServer.sh server1
   ./startServer.sh server1
   ```

Chapter 11. Uninstalling the Administration Center

Uninstall the Administration Center either by using one of two wizards or in silent mode.

Tip: To uninstall a version 6.2 Administration Center, see the instructions at the following website: http://publib.boulder.ibm.com/infocenter/tsminfo/v6r2. To uninstall a version 6.1 Administration Center, see the instructions at the following website: http://publib.boulder.ibm.com/infocenter/tsminfo/v6.

To uninstall the current version of the Administration Center, complete the following steps:

1. If you have the WebSphere server automatic restart set up, remove it before uninstalling the Administration Center.
   - Log in to the operating system with the root user ID.
   - Change to the installation directory. For example, the default directory is `/opt/IBM/tivoli/tsmac/bin`.
   - Run the following script:
     `./setTSMUnixLinks.sh uninstall`
2. Change to the `/opt/IBM/tivoli/tsmac/_uninst` directory.
3. Use one of the following methods to uninstall the Administration Center:

   Tip: Regardless of the method that you choose, you must provide a valid Administration Center user ID and password to uninstall the Administration Center.
   - To use the installation wizard (GUI) to uninstall the Administration Center, issue this command:
     `./uninstall`
   - To use the console to uninstall the Administration Center, issue this command:
     `./uninstall -i console`
   - To silently uninstall the Administration Center, issue the following command. Sample response files (`uninstall_response.txt`) are available with the Administration Center installation driver. Use one of the sample files to run a silent installation. Ensure that you enter the full path name to the sample response file.
     `./uninstall -i silent -f path_name_to_response_file`
4. Follow the prompts to uninstall the Administration Center. You see a message that the Administration Center uninstallation was successful.

See Chapter 10, "Installing and configuring the Administration Center," on page 111 for the installation steps to reinstall the Administration Center.

Chapter 12. Upgrading the Administration Center to Version 6.3 or later

To administer IBM Tivoli Storage Manager Version 6.3 or later servers, you must upgrade to the Administration Center Version 6.3 or later. The upgrade process consists of installing the new version and completing some manual configuration tasks.

If you are installing the Administration Center for the first time, see Chapter 10, "Installing and configuring the Administration Center," on page 111.

The IBM Tivoli Integrated Portal is a graphical user interface (GUI) framework. The Administration Center is installed into the Tivoli Integrated Portal as a plug-in.

Restriction: The Administration Center Version 6.3 or later is compatible only with the Tivoli Integrated Portal Version 2.1. If you have earlier versions of these applications installed, you must upgrade them both.

You can automatically migrate your Tivoli Integrated Portal settings, like your server connections and user preferences, from a Version 6.2 Administration Center during the installation process. However, some manual configuration is still required after you complete the installation.

Tip: If there is enough disk space, consider temporarily maintaining both the previous and current versions of the Administration Center. This coexistence strategy provides a functioning Administration Center during the upgrade and ensures that the configuration settings of the previous version remain available.

To support coexistence, assign non-conflicting ports for each Administration Center instance. You can use the same port definitions and run only one instance at a time, or you can assign separate ports and run the two instances concurrently.

You can also install the Administration Center into an existing Tivoli Integrated Portal Version 2.1 instance. This option also applies to fix packs.

Previous versions of the Administration Center are not automatically removed during an upgrade installation. You can manually uninstall a previous version after you complete and verify the upgrade installation.

Related tasks:

Chapter 10, "Installing and configuring the Administration Center," on page 111

Upgrading the Administration Center

To upgrade from a previous version of the Administration Center, you must install the new version and then recreate the previous Tivoli Integrated Portal or Integrated Solutions Console user accounts. In some cases, you must also recreate the previous Tivoli Storage Manager server connections.

When you upgrade the Administration Center to Version 6.3 or later, use the same user ID that was used to install the Version 6.2 Administration Center. If you use a

different user ID to upgrade the Administration Center to Version 6.3 or later, you must change the ownership of the Version 6.2 Administration Center folders accordingly.

If you do not know your Tivoli Integrated Portal password, reset it by following these instructions: "Resetting the Tivoli Integrated Portal installation wizard password" on page 131.

To upgrade the Administration Center, complete the following steps:

1. If you do not plan to automatically migrate a Version 6.2 Administration Center during the installation process, obtain information about the previously defined Tivoli Storage Manager server connections:

   - For a version 5.5 or earlier Administration Center, save the `tsmservers.xml` file that is in the Administration Center installation directory.
   - For a Version 6.1 or later Administration Center, download the server connections file. From the navigation tree in the Administration Center interface, expand **Tivoli Storage Manager** and click **Manage Servers > Download Connection File**.

     Tip: For more details about the server connections file, see the online help for the Manage Servers page.

2. Collect the administrative user account information from the previous Administration Center. For more information, see "Obtaining user account information in a Version 5.5 Administration Center" on page 137 or "Obtaining user account information in a Version 6.1 or later Administration Center" on page 137.

3. Install the Administration Center Version 6.3 or later.

   Important:
   - Extract the installation files into an empty directory. Do not extract to a directory that contains previously extracted files, or any other files.

4. Recreate the previous configuration in the new Administration Center:

   a. Define each Integrated Solutions Console or Tivoli Integrated Portal user account. For more information, see "Defining Administration Center users to the Tivoli Integrated Portal" on page 138.

   b. Edit the `tsmservers.xml` server connections file to specify the TIPRealm domain for each iscuser definition:

      ```
      <iscuser id="TIPRealm/userID" />
      ```

   c. Upload the server connections file. From the navigation tree in the Administration Center interface, expand **Tivoli Storage Manager** and click **Manage Servers > Upload Connection File**.

      When administrators log on to the Tivoli Integrated Portal, they are prompted to provide a Tivoli Storage Manager administrative user ID and password for the servers that they manage.

      Tip: If administrators manage many Tivoli Storage Manager servers, they can edit the `tsmservers.xml` file and add the Tivoli Storage Manager administrative credentials.

      Adding administrative credentials to the `tsmservers.xml` file prevents an administrator from having to provide the credentials after logging on to the Tivoli Integrated Portal, but including the passwords in the file can create a security exposure.

5. If you used one user ID to install the Administration Center Version 6.2 and a different user ID to upgrade to Version 6.3 or later, change the ownership of the Administration Center Version 6.2 folders to the ID that is performing the installation. For example:

   ```
   chmod -R <user_id> <AC_6.2_install_location>
   ```

6. Optional: Uninstall the previous version of the Administration Center.

   To uninstall a Version 6.2 Administration Center, see the instructions at the following website: http://publib.boulder.ibm.com/infocenter/tsminfo/v6r2.

   To uninstall a Version 6.1 Administration Center, see the instructions at the following website: http://publib.boulder.ibm.com/infocenter/tsminfo/v6.

Obtaining user account information in a Version 6.1 or later Administration Center

To access the Version 6.3 or later Administration Center, a Tivoli Integrated Portal user account is required. Tivoli Integrated Portal or Integrated Solutions Console user accounts that are defined in a previous version of the Administration Center must be manually recreated after upgrading to the latest version.

Complete the following steps to obtain information about the defined user IDs:

1. In the navigation tree, expand **Users and Groups** and click **Manage Users**.
2. In the **Search by** list, select **User ID**.
3. In the **Search for** list, enter an asterisk (*).
4. Click **Search**. The table shows all the defined user IDs. Capture this information for later use.
5. Determine the password for each of these user IDs.

Obtaining user account information in a Version 5.5 Administration Center

To access the Version 6.3 or later Administration Center, a Tivoli Integrated Portal user account is required. Integrated Solutions Console user accounts that are defined in a previous version of the Administration Center must be manually recreated after upgrading to the latest version.

Complete the following steps to obtain information about the defined user IDs:

1. In the navigation tree, expand **Console Settings** and click **User and Group Management**.
2. In the **Search** list, select **Users**.
3. In the **Search by** list, select **uid**.
4. In the **Search** field, enter an asterisk (*).
5. Click **Search**. The table shows all the defined user IDs. Capture this information for later use.
6. Determine the password for each of these user IDs.

Defining Administration Center users to the Tivoli Integrated Portal

When you upgrade the Administration Center to Version 6.3 or later, you must define the previous user accounts to the IBM Tivoli Integrated Portal.

Consider creating a separate Tivoli Integrated Portal user account for each Tivoli Storage Manager administrator. The administrators can then log on and use their Tivoli Storage Manager administrative credentials to create connections for the servers that they manage.

Complete the following steps to define the administrative user accounts:
1. In the navigation tree, expand **Users and Groups**.
2. Click **Manage Users**.
3. Click **Create**.
4. Click **Group Membership**.
5. Select **Group name**, then click **Search**.
6. Add TSM_AdminCenter to the Current groups list.

   Tip: To add the appropriate roles for users to access the Tivoli Common Reporting reports, see ../com.ibm.itsm.tshoot.doc/ts_pdg_no_existing_group.dita.
7. Click **Close**. The TSM_AdminCenter group is a shell for you to populate with users. You must manually enter the user credentials.
8. To ensure that an administrative user ID can start or stop the Tivoli Integrated Portal server, assign the `iscadmins` role to the administrative user ID.
9. Complete the form and click **Create**.

Server connections to the Administration Center

To use the Administration Center, administrators must create connections to one or more Tivoli Storage Manager servers. You can download a file that contains information about existing server connections from the Administration Center. You can then upload the file to quickly redefine server connections after an upgrade installation.

The Administration Center stores Tivoli Storage Manager server connection information in a file named `tsmservers.xml`. This file is located in the Administration Center installation directory.

When you install the Version 6.3 Administration Center you can choose to automatically migrate the configuration of an existing Version 6.2 Administration Center:
- If you select this option, the `tsmservers.xml` file is copied from the previous installation.
- If you do not select this option, or if you are upgrading an earlier version of the Administration Center, you can manually upload the connections file after you complete the installation.

By default, the `tsmservers.xml` file does not include Tivoli Storage Manager administrative user IDs and passwords for each server connection. Server connections that do not include these administrative credentials are treated as incomplete connections, which cannot be used until the credentials are provided.

After you upload the `tsmservers.xml` file, you can handle the incomplete server connections in two ways:

- Leave the connections in the incomplete state. When administrators log on to the Tivoli Integrated Portal, they are prompted to provide the administrative credentials for the servers that they manage.
- Use the **Change Password** action in the Manage Servers table to specify the administrative credentials for one or more server connections.

Tip: You can also edit the `tsmservers.xml` file directly and add the administrative credentials, if this is permitted by the security policies of your company. For more information, see the Administration Center online help for the Manage Servers page.

Part 4. Appendixes

Appendix A. Installation log files

If you experience errors during installation, these errors are recorded in several log files that are distributed in various locations.

Table 27 shows the files that are created when you install or uninstall Tivoli Storage Manager and recommends which files to check when looking for information that might help you troubleshoot problems:

Table 27. Contents of the `log.zip` file

File Name	Description	Location

The `log.txt` file contains information about the following Environment Checks:
• Platform
• Version
• Architecture
• Prerequisites
	Contains general information about an installation. Review this log file when any installation failures occur.	This file is located in:
		    `/var/tivoli/tsm`
		
		The InstallAnywhere exit codes show you the state of the installation. The codes are in the `log.txt` file and can also be called by command. You can retrieve the exit codes after the installation is completed. The exit codes are for both the Tivoli Storage Manager installation and upgrade wizards and the Tivoli Monitoring for Tivoli Storage Manager installation wizard.
		
		To use the command line, issue the following command:
		`echo $?`
		
		See Table 28 on page 144 for all the InstallAnywhere exit codes.

`logs.zip`	The Tivoli Storage Manager server `logs.zip` file contains the following subdirectories: • coi: contains installation log files • de: contains deployment engine log files • ia: contains the `log.txt` file and native installer log files, for example, `tsm_server.log`, `tsm_license.log`, and `db2_inst.log`	This file is located in: `/var/tivoli/tsm`
`DE_Install.log`	Contains information about the deployment engine installation. Review this log file if the deployment engine installation fails.	`de/root`
`db2setup.log`	Contains information about the DB2 installation. Review this log file if the DB2 installation fails.	`coi/plan/tmp`
`db2_uninst.log`	Contains information about the DB2 uninstallation	`coi/plan/logs`

Table 27. Contents of the `log.zip` file (continued)

File Name	Description	Location
DB2.log	Contains information about the installation and uninstallation commands. Return codes can be retrieved from this log file, but not for DB2. If installation or uninstallation completed, the executePackage or remove-package scripts for a component are available.	`coi/plan/install` or `coi/plan/uninstall`
Administration Center installation log files	Installation log files. Review these log files if the Administration Center installation or uninstallation fails. For log information about additional Administration Center components, see the *Problem Determination Guide*.	• `coi/plan/install/logs` • `coi/plan/install/MachinePlan_host_name/` `00001_eWAS` • `coi/plan/install/MachinePlan_host_name/` `00002_TIP` • `coi/plan/install/MachinePlan_host_name/` `00003_TSM_AdminCenter` or • `install_root/_uninst/plan/install/` `MachinePlan_host_name/00001_eWAS` • `install_root/_uninst/plan/install/` `MachinePlan_host_name/00002_TIP` • `install_root/_uninst/plan/install/` `MachinePlan_host_name/00003_TSM_AdminCenter`

For information about exit codes for the Tivoli Storage Manager server, Administration Center, or Tivoli Monitoring for Tivoli Storage Manager wizards, see Table 28.

Tip: Some of the exit codes for a silent installation might be different than the exit codes for a GUI or console installation. For example, an exit code of 1 for a silent installation means that the installation completed successfully without warnings or errors. However, for a GUI or console installation, an exit code of 1 means that the installation completed, but that one or more of the actions from the installation sequence caused a warning or non-fatal error. See the *Problem Determination Guide* for the latest information.

Table 28. InstallAnywhere exit codes

Code	Description
0	Success: The installation completed successfully without any warnings or errors.
1	The installation completed successfully, but one or more of the actions from the installation sequence caused a warning or a non-fatal error.
-1	One or more of the actions from the installation sequence caused an unrecoverable error.
1000	The installation was canceled by the user.
1001	The installation includes an invalid command-line option.
2000	Unhandled error.
2001	The installation failed the authorization check, might indicate an expired version.
2002	The installation failed a rules check. A rule placed on the installer itself failed.
2003	An unresolved dependency in silent mode caused the installer to exit.

Table 28. InstallAnywhere exit codes (continued)

Code	Description
2004	The installation failed because not enough disk space was detected during the execution of the Install action.
2006	The installation failed because it was launched in a UI mode that is not supported by this installer.
3000	Unhandled error specific to a launcher.
3001	The installation failed due to an error specific to the lax.main.class property.
3002	The installation failed due to an error specific to the lax.main.method property.
3003	The installation was unable to access the method specified in the lax.main.method property.
3004	The installation failed due to an exception error caused by the lax.main.method property.
3005	The installation failed because no value was assigned to the lax.application.name property.
3006	The installation was unable to access the value assigned to the lax.nl.java.launcher.main.class property.
3007	The installation failed due to an error specific to the lax.nl.java.launcher.main.class property.
3008	The installation failed due to an error specific to the lax.nl.java.launcher.main.method property.
3009	The installation was unable to access the method specified in the lax.nl.launcher.java.main.method property.
4000	A component to start Java could not be found at the directory specified by the java.home system property.
4001	An incorrect path to the installer jar caused the relauncher to launch incorrectly.

Appendix B. Accessibility features for the Tivoli Storage Manager product family

Accessibility features help users who have a disability, such as restricted mobility or limited vision, to use information technology products successfully.

Accessibility features

The following list includes the major accessibility features in the Tivoli Storage Manager family of products:

- Keyboard-only operation
- Interfaces that are commonly used by screen readers
- Keys that are discernible by touch but do not activate just by touching them
- Industry-standard devices for ports and connectors
- The attachment of alternative input and output devices

If you install the IBM Tivoli Storage Manager Operations Center in console mode, the installation is fully accessible.

The accessibility features of the Operations Center are fully supported only in the Mozilla Firefox browser that is running on a Windows system.

The Tivoli Storage Manager Information Center, and its related publications, are accessibility-enabled. For information about the accessibility features of the information center, see the following topic: http://pic.dhe.ibm.com/infocenter/tsminfo/v6r3/topic/com.ibm.help.ic.doc/iehs36_accessibility.html.

Keyboard navigation

On Windows, the Tivoli Storage Manager product family follows Microsoft conventions for all keyboard navigation and access. Drag and Drop support is managed by using the Microsoft Windows Accessibility option known as *MouseKeys*. For more information about MouseKeys and other Windows accessibility options, see the Windows online help, citing the keyword "MouseKeys".

On other operating systems, these products follow the operating-system conventions for keyboard navigation and access.

Vendor software

The Tivoli Storage Manager product family includes certain vendor software that is not covered under the IBM license agreement. IBM makes no representation about the accessibility features of these products. Contact the vendor for the accessibility information about its products.

IBM and accessibility

See the IBM Human Ability and Accessibility Center (http://www.ibm.com/able) for information about the commitment that IBM has to accessibility.

Notices

This information was developed for products and services offered in the U.S.A.

IBM may not offer the products, services, or features discussed in this document in other countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not grant you any license to these patents. You can send license inquiries, in writing, to:

IBM Director of Licensing
IBM Corporation
North Castle Drive
Armonk, NY 10504-1785
U.S.A.

For license inquiries regarding double-byte character set (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

Intellectual Property Licensing
Legal and Intellectual Property Law
IBM Japan Ltd
1623-14, Shimotsuruma, Yamato-shi
Kanagawa 242-8502 Japan

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law: INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who want to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact:

IBM Corporation
2Z4A/101
11400 Burnet Road
Austin, TX 78758
U.S.A.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this information and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement, or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

This information is for planning purposes only. The information herein is subject to change before the products described become available.

This information contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

COPYRIGHT LICENSE:

This information contains sample application programs in source language, which illustrate programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs. The sample

programs are provided "AS IS", without warranty of any kind. IBM shall not be liable for any damages arising out of your use of the sample programs.

Each copy or any portion of these sample programs or any derivative work, must include a copyright notice as follows: © (your company name) (year). Portions of this code are derived from IBM Corp. Sample Programs. © Copyright IBM Corp. _enter the year or years_.

If you are viewing this information in softcopy, the photographs and color illustrations may not appear.

Trademarks

IBM, the IBM logo, and ibm.com® are trademarks or registered trademarks of International Business Machines Corp., registered in many jurisdictions worldwide. Other product and service names might be trademarks of IBM or other companies. A current list of IBM trademarks is available on the Web at "Copyright and trademark information" at http://www.ibm.com/legal/copytrade.shtml.

Linux is a registered trademark of Linus Torvalds in the United States, other countries, or both.

Microsoft and Windows are trademarks of Microsoft Corporation in the United States, other countries, or both.

UNIX is a registered trademark of The Open Group in the United States and other countries.

Java and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle and/or its affiliates.

Glossary

A glossary is available with terms and definitions for the IBM Tivoli Storage Manager family of products.

You can view the glossary in the Tivoli Storage Manager information center at http://pic.dhe.ibm.com/infocenter/tsminfo/v6r3.

To view glossaries for other IBM products, see http://www.ibm.com/software/globalization/terminology/.

Index

Special characters

(TLS) Transport Layer Security   54

A

access rights
   configuration for deployment engine
      UNIX operating systems   59
accessibility features   147
activating
   server
      AIX, HP-UX, Linux, Solaris   59
active log
   space requirements   14
Administration Center
   ASCII
      language   122, 124
   backward compatibility   135
   configuring server   41, 45
   console installation wizard   122, 124
   default port   122, 124
   DISPLAY   122, 124
   estimating requirements   112
   I/O throughput   113
   installation   122, 124
   installation log   122, 124
   installing   122, 124
   Java   114
   Java heap memory size   116
   Java heap size   114
   languages
      set   122, 124
   LD_LIBRARY_PATH_64   122, 124
   location   118
   memory usage   114
   non-ASCII
      language   122, 124
   number of administrators   113
   overview   111
   port   122, 124
   post-installation tasks   125
   prerequisite checker   7, 122
   processing capacity   113
   processing memory   114
   secure port   122, 124
   SELINUX   122, 124
   server connection to   138
   system requirements   112
   Tivoli Storage Manager installation   130
   uninstalling   130, 133
   upgrading   135
   verifying   130
   verifying prerequisites   7, 122
   worksheet   118
Administration Center, configuration wizard   48
administrative commands
   HALT   63
   REGISTER LICENSE   63
API   46, 55
API configuration   46, 55

archive failover log space
   description   25
archive log
   space requirements   14
archive log directory   43
ASCII
   language   31, 32
automatic starting, server   61

B

BACKUP DB command   46, 55
backup-archive client
   installable package   vi
backups
   database   63

C

CandleManage   104
capacity planning
   database space requirements
      estimates based on number of files   11
      estimates based storage pool capacity   13
      starting size   10
   recovery log space requirements
      active and archive logs   14
      active log mirror   25
client nodes
   reverting to previous server version
      data affected   91
client options
   for shared memory communications   53
commands
   administrative, SET DBRECOVERY   63
   DSMSERV FORMAT   55
commands, administrative
   HALT   63
   REGISTER LICENSE   63
communication methods
   Shared Memory   53
   SNMP   53
   TCP/IP   52
compatibility, server with other DB2 products   8
components
   installable   v
configuration
   Administration Center   125
configuration wizard, Administration Center   48
configuring   41, 45, 48, 49
   data source after upgrade   135
   monitoring agent instance on an IBM Tivoli Monitoring
     server
      on Windows   103
   Tivoli Monitoring for Tivoli Storage Manager agent
     instance on an IBM Tivoli Monitoring server
      using CandleManage   104
      using CLI   106
configuring, manually   41, 45, 49
configuring, server instance   45

IBM ®