IBM Tivoli Storage Manager
for UNIX

IBM

Backup-Archive Clients Installation and User's Guide

Version 5 Release 2

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> **Note**
>
> Before using this information and the product it supports, read the general information under "Notices" on page 453.

Fifth Edition (December 2003)

This edition applies to version 5, release 2, modification 2 of IBM Tivoli Storage Manager (5698-ISM), IBM Tivoli Storage Manager Extended Edition (5698-ISX), IBM Tivoli Storage Manager for Storage Area Networks (5698-SAN), and to all subsequent releases and modifications until otherwise indicated in new editions or technical newsletters.

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

Your feedback is important in helping to provide the most accurate and high-quality information. If you have comments about this manual or any other Tivoli Storage Manager documentation, see "Contacting customer support" on page xvi.

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About this book

IBM® Tivoli® Storage Manager is a client-server licensed product that provides storage management services in a multi-platform computer environment. The backup-archive client program permits users to back up and archive files from their workstations or file servers to storage, and restore and retrieve backup versions and archived copies of files to their local workstations.

In addition to the backup-archive client, Tivoli Storage Manager includes the following components available on a variety of platforms:

- A *server program* that permits systems to perform either as a backup and archive server or migration server for distributed workstations and file servers. The server program also supplies hierarchical storage management (HSM) services. See "Related publications" on page xv for available server publications.

- An *administrative client program* that you can access from a Web browser or the command line. The program permits a Tivoli Storage Manager administrator to control and monitor server activities, define storage management policies for backup, archive and space management services, and set up schedules to perform those services at regular intervals. For more information about the Administrative client, see "Related publications" on page xv for available Tivoli Storage Manager Administrator's Reference publications.

- An *application program interface (API)* that permits you to enhance an existing application with storage management services. When an application is registered with a server as a client node, the application can back up, restore, archive, and retrieve objects from storage. For more information about the Tivoli Storage Manager API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.

- A *Web backup-archive client* that permits an authorized administrator, help desk person, or end user to perform backup, restore, archive, and retrieve services using a Web browser on a remote machine. See "Starting a Web client session" on page 63 for more information.

Associated with Tivoli Storage Manager, but sold separately, is the *Tivoli Space Manager* client program which was previously a feature of ADSM known as *Hierarchical Storage Manager* (HSM). Tivoli Space Manager automatically migrates eligible files to storage to maintain specific levels of free space on local file systems and automatically recalls migrated files when they are accessed. It also permits users to migrate and recall specific files. This client program runs only on AIX, HP-UX, Linux for X86, and Solaris operating systems. For specific software requirements, see the README file that is shipped on the product installation media. See *IBM Tivoli Storage Manager for Space Management for UNIX User's Guide* for more information.

The terms *hierarchical storage management* and *space management* have the same meaning throughout this publication.

Who should read this manual

This manual provides instructions for an end-user to install, configure, and use the Tivoli Storage Manager client. For installation information and supported operating system levels, see Chapter 1, "Installing Tivoli Storage Manager," on page 1. For configuration information, see Chapter 2, "Configuring Tivoli Storage Manager," on page 33.

This manual assumes that you are familiar with your workstation, your operating system, and your basic system administration.

Tivoli Storage Manager tasks that can only be performed by authorized users and root users are identified by the phrases, **Authorized User** and **root user**. See "Root and authorized user tasks" on page 33 for more information about these tasks. An Authorized User is any user running with a real user ID of 0 (root) or a user who owns the Tivoli Storage Manager executable and whose owner execution permission bit is set to **s**. In the following example, the user **tivoli** is an Authorized User while running dsmc since the dsmc owner execution permission bit is set to **s**:

```
-rwsr-xr-x  1  tivoli  dsmdev  2880479  Nov  5 13:42  dsmc*
```

IBM Tivoli Storage Manager Web site

Technical support information and publications are available at the following address:

```
http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html
```

By accessing the Tivoli Storage Manager home page, you can access subjects that interest you. You can also access current Tivoli Storage Manager product information.

The Tivoli Storage Manager home page **Self help** section provides customers with a knowledge base of articles and information on issues with Tivoli Storage Manager that they might be experiencing.

Conventions used in this book

This book uses the following typographical conventions:

Table 1. Typographical conventions

Example	Description
dsmc.nlm	A series of lowercase letters with an extension indicates Tivoli Storage Manager program file names.
archive	Boldface type indicates a command that you type at a workstation, such as a command you type on a command line.
dateformat	Boldface italic type indicates a Tivoli Storage Manager option. The bold type is used to introduce the option, or used in an example. Occasionally, file names are entered in boldface italic for emphasis.
filespec	Italicized type indicates either the name of a parameter, a new term, or a placeholder for information that you provide. Italics are also used for emphasis in the text.

Table 1. Typographical conventions (continued)

Example	Description
`maxcmdretries`	Monospaced type represents fragments of a program or information as it would display on a screen.
plus sign (+)	A plus sign between two keys indicates you should press both keys at the same time.

Reading syntax diagrams

This section describes how to read the syntax diagrams used in this manual. To read a syntax diagram, follow the path of the line. Read from left to right, and top to bottom.

- The ►►── symbol indicates the beginning of a syntax diagram.
- The ──→ symbol at the end of a line indicates the syntax diagram continues on the next line.
- The ►── symbol at the beginning of a line indicates a syntax diagram continues from the previous line.
- The ──►◄ symbol indicates the end of a syntax diagram.

Syntax items, such as a keyword or variable, can be:
- On the line (required element)
- Above the line (default element)
- Below the line (optional element).
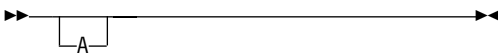
Syntax diagram description	Example
Abbreviations: Uppercase letters denote the shortest acceptable truncation. If an item appears entirely in uppercase letters, it cannot be truncated. You can type the item in any combination of uppercase or lowercase letters. In this example, you can enter KEYWO, KEYWORD, or KEYWOrd.	►►──KEYWOrd──────────────────────►◄
Symbols: Enter these symbols exactly as they appear in the syntax diagram.	* Asterisk { } Braces : Colon , Comma = Equal Sign - Hyphen () Parentheses . Period Space
Variables: Italicized lowercase items (*var_name*) denote variables. In this example, you can specify a *var_name* when you enter the KEYWORD command.	►►──KEYWOrd──*var_name*────────────►◄
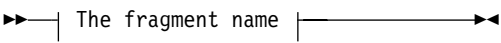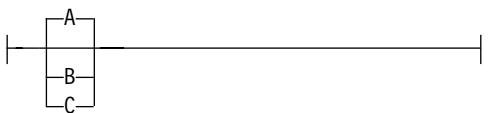
Syntax diagram description	Example

Repetition:

An arrow returning to the left means you can repeat the item.

```
        ┌──────────┐
        │          │
►►──────▼──repeat──┴─────────────────────────►◄
```

A character or space within the arrow means you must separate repeated items with that character or space.

```
        ┌────,─────┐
        │          │
►►──────▼──repeat──┴─────────────────────────►◄
```

A footnote by the arrow references the number of times you can repeat the item.

```
        ┌──────(1)──────┐
        │               │
►►──────▼──repeat───────┴──────────────────────►◄
```

Notes:

1   Specify *repeat* as many as 5 times.

Required choices:

When two or more items are in a stack and one of them is on the line, you *must* specify one item.

```
►►──┬──A──┬─────────────────────────────────►◄
    ├──B──┤
    └──C──┘
```

In this example, you *must* choose A, B, or C.

Optional choice:

When an item is below the line, that item is optional. In the first example, you can choose A or nothing at all.

```
►►──┬──────┬─────────────────────────────────►◄
    └──A───┘
```

When two or more items are in a stack below the line, all of them are optional. In the second example, you can choose A, B, C, or nothing at all.

```
►►──┬──────┬─────────────────────────────────►◄
    ├──A───┤
    ├──B───┤
    └──C───┘
```

Defaults:

Defaults are above the line. The default is selected unless you override it. You can override the default by including an option from the stack below the line.

```
    ┌──A───┐
►►──┼──────┼─────────────────────────────────►◄
    ├──B───┤
    └──C───┘
```

In this example, A is the default. You can override A by choosing B or C. You can also specify the default explicitly.

Syntax diagram description	Example
Repeatable choices: A stack of items followed by an arrow returning to the left means you can select more than one item or, in some cases, repeat a single item. In this example, you can choose any combination of A, B, or C.	▶▶─┬─A─┬────────────────────◀◀ ├─B─┤ └─C─┘
Syntax fragments: Some diagrams, because of their length, must fragment the syntax. The fragment name appears between vertical bars in the diagram. The expanded fragment appears between vertical bars in the diagram after a heading with the same fragment name.	▶▶──┤ The fragment name ├──────◀◀ **The fragment name:** ├─┬─A─┬─────────────────────┤ ├─B─┤ └─C─┘

Related publications

Table 2 lists the IBM Tivoli Storage Manager client and server publications that are referred to in this manual.

Table 2. IBM Tivoli Storage Manager client and server publications

Publication title	Order number
Client publications	
IBM Tivoli Storage Manager Messages	GC32-0767
IBM Tivoli Storage Manager for Windows Backup-Archive Clients Installation and User's Guide	GC32-0788
IBM Tivoli Storage Manager for NetWare Backup-Archive Clients Installation and User's Guide	GC32-0786
IBM Tivoli Storage Manager for Macintosh Backup-Archive Clients Installation and User's Guide	GC32-0787
IBM Tivoli Storage Manager for Space Management for UNIX User's Guide	GC32-0794
IBM Tivoli Storage Manager Using the Application Programming Interface	GC32-0793
IBM Tivoli Storage Manager for Application Servers 5.2: Data Protection for WebSphere Application Server Installation and User's Guide	SC32-9075
Server publications	
IBM Tivoli Storage Manager for AIX Quick Start	GC32-0770
IBM Tivoli Storage Manager for AIX Administrator's Reference	GC32-0769
IBM Tivoli Storage Manager for AIX Administrator's Guide	GC32-0768
IBM Tivoli Storage Manager for AIX Storage Agent User's Guide	GC32-0771
IBM Tivoli Storage Manager for HP-UX Quick Start	GC32-0774
IBM Tivoli Storage Manager for HP-UX Administrator's Reference	GC32-0773
IBM Tivoli Storage Manager for HP-UX Storage Agent User's Guide	GC32-0727
IBM Tivoli Storage Manager for Linux Quick Start	GC23-4692
IBM Tivoli Storage Manager for Linux Administrator's Reference	GC23-4691
IBM Tivoli Storage Manager for Linux Storage Agent User's Guide	GC23-4693
IBM Tivoli Storage Manager for OS/390 and z/OS Quick Start	GC32-0777

Table 2. IBM Tivoli Storage Manager client and server publications (continued)

Publication title	Order number
IBM Tivoli Storage Manager for OS/390 and z/OS Administrator's Reference	GC32-0776
IBM Tivoli Storage Manager for OS/400 PASE Quick Start	GC23-4696
IBM Tivoli Storage Manager for Sun Solaris Quick Start	GC32-0780
IBM Tivoli Storage Manager for Sun Solaris Administrator's Reference	GC32-0779
IBM Tivoli Storage Manager for Sun Solaris Administrator's Guide	GC32-0778
IBM Tivoli Storage Manager for Sun Solaris Storage Agent User's Guide	GC32-0781
IBM Tivoli Storage Manager for Windows Quick Start	GC32-0784
IBM Tivoli Storage Manager for Windows Administrator's Guide	GC32-0782

Downloading or ordering publications

All Tivoli publications are available for electronic download or order from the IBM Publications Center: http://www.ibm.com/shop/publications/order/.

The Tivoli Storage Manager publications are available on the following CD-ROM:

Tivoli Storage Manager Publications Version 5.2, SK3T-8176

The format of the publications is PDF and HTML.

If you have questions or comments regarding Tivoli publications and product documentation, please visit http://www.ibm.com/software/tivoli/contact.html to send an e-mail.

The International Technical Support Center (ITSC) publishes Redbooks, which are books on specialized topics such as using Tivoli Storage Manager to back up databases. You can order publications through your IBM representative or the IBM branch office serving your locality. You can also search for and order books of interest to you at the IBM Redbooks Web site at this address:

`http://www.ibm.com/redbooks/`

Tivoli Field Guides are designed to address specific technical scenarios or concepts that are often complex to implement or difficult to understand. All completed field guides are available free to registered customers and internal IBM employees at the following Web site:

`http://www.ibm.com/software/sysmgmt/products/support/Field_Guides.html`

Contacting customer support

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

- Visit the Tivoli Storage Manager technical support Web site at:

  `http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html`

- Submit a problem management record (PMR) electronically at **IBMSERV/IBMLINK**. You can access the IBMLINK from the IBM Web site at:

  `http://www.ibm.com/ibmlink/`

- Submit a problem management record (PMR) electronically from the IBM Web site at:

  `http://www.ibm.com/software/support/probsub.html`.

Customers in the United States can also call 1-800-IBM-SERV (1-800-426-7378).

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

You can also review the *IBM Software Support Guide*, which is available on our Web site at http://techsupport.services.ibm.com/guides/handbook.html.

When you contact IBM Software Support, be prepared to provide identification information for your company so that support personnel can readily assist you. Company identification information is needed to register for online support available on the Web site.

The support Web site offers extensive information, including a guide to support services (IBM Software Support Guide); frequently asked questions (FAQs); and documentation for all IBM Software products, including Release Notes, Redbooks, and white papers, defects (APARs), and solutions. The documentation for some product releases is available in both PDF and HTML formats. Translated documents are also available for some product releases.

We are very interested in hearing about your experience with Tivoli products and documentation. We also welcome your suggestions for improvements. If you have comments or suggestions about our documentation, please complete our customer feedback survey at:

`http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html`

by selecting the Feedback link in the left navigation bar.

Reporting a problem

Please have the following information ready when you report a problem:
- The Tivoli Storage Manager server version, release, modification, and service level number. You can get this information by entering the **query status** command at the Tivoli Storage Manager command line.
- It is recommended that you use the Tivoli Storage Manager client **query systeminfo** command with the *filename* option to gather Tivoli Storage Manager system information and output this information to a file. This information is intended primarily as an aid for IBM support to assist in diagnosing problems.
- The Tivoli Storage Manager client version, release, modification, and service level number. You can get this information by entering `dsmc` at the command line.
- The communication protocol (for example, TCP/IP), version, and release number you are using.
- The activity you were doing when the problem occurred, listing the steps you followed before the problem occurred.
- The exact text of any error messages.

Internet

You can find client and server patches, device support, and maintenance updates for current and previous versions of Tivoli Storage Manager through the anonymous FTP server, ftp://ftp.software.ibm.com. IBM Tivoli Storage Manager information is in the /storage/tivoli-storage-management directory.

A newsgroup, *listserv@marist.edu*, is implemented by a third party. IBM supports this newsgroup on a best-effort basis only. See "Online forum" on page 67 for more information.

Summary of changes for Tivoli Storage Manager

This section summarizes changes made to the Tivoli Storage Manager product and this publication. Technical changes to the text are indicated by vertical lines to the left of the change.

Technical changes for version 5.2.2 - December 2003

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

Tivoli Storage Manager backup-archive client Linux on iSeries
> The Tivoli Storage Manager backup-archive client supported features on Linux for iSeries are the same as those supported by the Linux for pSeries client. See Chapter 1, "Installing Tivoli Storage Manager," on page 1 for environment and installation information.

Tivoli Storage Manager backup-archive client for Linux on Intel Itanium
> The Tivoli Storage Manager backup-archive client for Linux on Intel Itanium (Linux IA64 client) supports these file systems and their ACLs: xfs, ext2, and ext3. As with the Linux for X86 client, the Linux IA64 client supports the reiserfs file system, but not its ACLs.
>
> The Tivoli Storage Manager Linux IA64 client supports the same functions as the Linux86 client, except the following:
> - Backup-archive Native Graphical User Interface (Motif GUI).
> - LAN-free data transfer.
> - Cluster support.
>
> See Chapter 1, "Installing Tivoli Storage Manager," on page 1 for environment and installation information.

Backup and restore support for IBM TotalStorage SAN File Systems
> Backup and restore for IBM TotalStorage SAN File Systems is supported on the AIX 5.1 client. See "File system and ACL support" on page 72 for more information.

Support for controlling symbolic link processing
> Tivoli Storage Manager treats symbolic links as actual files and backs them up. However, the file referenced by the symbolic link is not backed up. In some cases symbolic links can be easily recreated and need not be backed up. In addition, backing up these symbolic links can increase backup processing time and occupy a substantial amount of space on the Tivoli Storage Manager server. You can use the *exclude.attribute.symlink* option to exclude a file or a group of files that are symbolic links from backup processing. If necessary, you can use the *include.attribute.symlink* option to include symbolic links within a broad group of excluded files for backup processing. For additional information, see :
> - "Using include-exclude options" on page 51
> - "Exclude options" on page 208
> - "Include options" on page 231

Support for WebSphere Application Server (WAS) security
> If WAS security is enabled, user name and password validation for Data Protection for WebSphere Application Server is required. If you do not set the WAS password for the security, the backup will failover to an offline

backup. It is recommended to set the WAS security password to perform consistent backups. Use the **set waspassword** command to set the user name and password for each installation of WAS on your machine. You only need to perform this task once, unless you change your WAS user name or password. You can only perform this task on the Tivoli Storage Manager command line. See "Set Waspassword" on page 433 for more information.

Removal of operand limits for backup and archive operations
Use the *removeoperandlimit* option to specify that Tivoli Storage Manager removes the 20-operand limit for UNIX-family platforms. If you specify the *removeoperandlimit* option with the **incremental**, **selective**, or **archive** commands, the 20-operand limit is not enforced and is restricted only by available resources or other operating system limits. See "Removeoperandlimit" on page 281

Multi-session backup session enhancements
Use the *collocatebyfilespec* option to specify whether the Tivoli Storage Manager client uses only one server session to send objects generated from one file specification. Setting the *collocatebyfilespec* option to *yes* eliminates interspersing of files from different file specifications, by limiting the client to one server session per file specification. Therefore, if you store the data to tape, files for each file specification are stored together on one tape (unless another tape is required for more capacity). See "Collocatebyfilespec" on page 175 for more information.

Language support expanded to include Russian, Hungarian, Polish, and Czech
Tivoli Storage Manager client language packs are available in Russian, Hungarian, Polish, and Czech language locales. See "Setting language environment variables" on page 39 for more information.

Technical changes for version 5.2 - April 2003

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

Support for backing up files from one or more file space origins
You can use the Tivoli Storage Manager command line client to create and back up a group containing a list of files from one or more file space origins to a virtual file space on the Tivoli Storage Manager server. A *group backup* allows you to create a point-in-time backup of a group of files that is managed as a single logical entity. See "Group backup: Backing up files from one or more file spaces" on page 81 for more information.

Network Data Management Protocol (NDMP) file-level restore
NDMP support is enhanced to allow you to restore individual files from your Network Attached Storage (NAS) file system image backups. Use the *toc* option with the *include.fs.nas* option in your client system options file (dsm.sys) to specify whether Tivoli Storage Manager saves Table of Contents (TOC) information during a NAS file system image backup. If you save TOC information, you can use the Web client or the Tivoli Storage Manager server **restore node** command to restore individual files or directory trees from the NAS file system image that you specify. See "Toc" on page 321 for more information.

NDMP support is available only on IBM Tivoli Storage Manager Extended Edition.

Support for processing EMC Celerra NAS file system images
Through support of NDMP, Tivoli Storage Manager Windows, AIX, and

Solaris servers can efficiently back up and restore NAS file system images to tape drives or libraries that are locally attached to Network Appliance and EMC Celerra NAS file servers. *NDMP support is available only on IBM Tivoli Storage Manager Extended Edition.* See "NDMP support requirements (Extended Edition only)" on page 1 for NDMP support requirements. See "Backing up NAS file systems" on page 87 for information on how to back up and restore NAS file system images using the Web client and command line client.

Support for backup and restore of the WebSphere Application Server
If you installed the Data Protection for WebSphere Application Server, you can use Tivoli Storage Manager to back up the Version 5.0 WebSphere Application Server Network Deployment Manager (contains setup, application files, and configuration information) or the Application Server to the Tivoli Storage Manager server. You can restore this information from the Tivoli Storage Manager server and use it to recover a corrupted node application or an entire node (or nodes) in the event of an accident or disaster.

Data Protection for WebSphere Application Server is a separately priced and licensed product. Data Protection for WebSphere Application Server is only supported on a Tivoli Storage Manager Version 5.2 server and client. Data Protection for WebSphere Application Server is supported on the AIX 5.1 with Maintenance level 2; Solaris 8; Red Hat Advanced Server 2.1 for x86, SuSE Linux 7.3 for x86, SuSE SLSE 7 for x86, and United Linux 1.0 for x86 clients only.

See "Backing up the WebSphere Application Server (WAS)" on page 90 for more information.

Enhancements for command line image restore operations
You can use the *verifyimage* option with the **restore image** command to specify that you want to enable detection of bad sectors on the destination target volume. If bad sectors are detected on the target volume, Tivoli Storage Manager issues a warning message on the console and in the error log. See "Verifyimage" on page 330 for more information.

If bad sectors are present on the target volume, you can use the *imagetofile* option with the **restore image** command to specify that you want to restore the source image to a file. Later, you can use a 'dd' utility (available on Unix) or its equivalent to copy data from this file to a logical volume. See "Imagetofile" on page 226 for more information.

Support for an external snapshot provider in the backup-archive clients
Use the *snapshotroot* option with the **incremental**, **selective**, or **archive** commands in conjunction with a third-party application that provides a snapshot of a logical volume, to associate the data on the local snapshot with the real file space data that is stored on the Tivoli Storage Manager server. The *snapshotroot* option does not provide any facilities to take a volume snapshot, only to manage data created by a volume snapshot. See "Snapshotroot" on page 304 for more information.

Enhancements to the Web client interface
The following functions are now supported in the Tivoli Storage Manager Web client interface:
Access Another Node
Displays the backup versions and archive copies of another node. You can then restore the backup versions or retrieve the archives

from the other user to your workstation. *You must have authorization to access the stored data of another node.*

Node Access List
Allows you to authorize other users to access your backup versions and archive copies.

View Policy Information
Displays storage management policy information for your node.

Enhanced firewall security
Security for back up and restore operations and Tivoli Storage Manager administrative functions is enhanced to allow the Tivoli Storage Manager server to control whether the server or client initiates sessions through a firewall. See "Sessioninitiation" on page 299 for more information.

Both the server and client can also specify a separate TCP/IP port number on which the server is waiting for requests for administrative client sessions, allowing secure administrative sessions within a private network. See "Tcpadminport" on page 311 for more information.

Veritas file systems, ACLs, and Veritas Volume Manager support on AIX (32-bit and 64-bit) clients
Tivoli Storage Manager supports backup, restore, archive, and retrieve of Veritas file systems (VxFS) including ACLs on the AIX (32-bit and 64-bit) clients. Image backup and restore of Veritas Volume Manager logical volumes is also supported.

Automounter support for Linux86 and Linux390 clients
The Tivoli Storage Manager Linux86 and Linux390 clients now support the back up of automounted NFS and loopback file systems. Use the *automount* option with the *domain* option to specify all automounted file systems the Tivoli Storage Manager client tries to mount at the following points in time:
• When Tivoli Storage Manager client starts
• When the back up is started
• When the Tivoli Storage Manager client has reached an automounted file system during backup

See "Automount" on page 171 and "Domain" on page 194 for more information.

Support for displaying options and their settings via the command line
Use the **query options** command to display all or part of your options and their current settings. This command accepts an argument to specify a subset of options. The default is to display all options. See "Query Options" on page 399 for more information.

Support for gathering Tivoli Storage Manager system information
Use the **query systeminfo** command to gather information on one or more of the following items and output this information to a file name that you specify:
• DSMOPTFILE - The contents of dsm.opt file.
• ENV - Environment variables.
• ERRORLOG - The Tivoli Storage Manager error log file.
• FILE - Attributes for the file name that you specify.
• INCLEXCL - Compiles a list of include-exclude in the order in which they are processed during backup and archive operations.
• OPTIONS - Compiled options.

- OSINFO - Name and version of the client operating system (includes ULIMIT information for UNIX).
- POLICY - Policy set dump.
- DSMSYSFILE - The contents of the dsm.sys file.
- CLUSTER - AIX cluster information.

See "Query Systeminfo" on page 403 for more information.

Enhancements for the query filespace command
The **query filespace** command is enhanced to allow you to query a single file space on the Tivoli Storage Manager server. See "Query Filespace" on page 390 for more information.

Separately installable language packs available
Language packs are separately installable packages that contain only language-specific files (such as message catalog, resource file, help files, etc.). You can now install these additional language packs on top of your Tivoli Storage Manager client base install. To change your language preferences, specify the LANG environment variable or use the Preferences editor.

Technical changes for version 5.1.5 - September 2002

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

Lan-free data movement support on Linux86 client
Tivoli Storage Manager supports LAN-Free data movement in a storage area network (SAN) environment for the Linux86 client. LAN-Free data movement allows client data to move directly from the client to a SAN-attached storage device. Shifting the client data movement from the communications network to a SAN decreases the load on the server. This allows the server to support a greater number of simultaneous client connections. See "LAN-free data movement" on page 71 for more information.

New backup-archive option to preserve last access date of files
For backup and archive operations, you can use the *preservelastaccessdate* option to specify whether the client should reset the last access dates of backed up or archived files to their original value. The default behavior is to not reset the last access date. See "Preservelastaccessdate" on page 274 for more information.

Linux86 client support for the General Parallel File System (GPFS)
Tivoli Storage Manager supports backup and restore of the General Parallel File System (GPFS) on the Linux86 client. See "Incremental" on page 375 for more information.

Enhanced domain processing
Domain processing is enhanced to allow you to include and exclude items from the domain. Previous versions of Storage Manager only allowed you to include items in the domain. See "Domain" on page 194 for more information.

64-Bit support for the Tivoli Storage Manager HP-UX client
The Tivoli Storage Manager 32-bit HP-UX client can perform backup, restore, archive, and retrieve functions to a Tivoli Storage Manager 64-bit server via the Shared Memory communication method.

Support for a globally unique identifier (GUID)
The globally unique identifier (GUID) associates a client node with a host

system. When you install the Tivoli software, the tivguid program is run to generate a GUID which is stored in the /etc/tivoli directory on a UNIX system. The GUID for a client node on the server can change if the host system machine is corrupted, if the file entry is lost, or if a user uses the same node name from different host systems. You can perform the following functions from the command line:
- Create a new GUID
- View the current GUID
- Write a specific value
- Create another GUID even if one exists.

See "Associating your client node with a host system (optional)" on page 49 for more information.

Enhanced query backup and query archive commands
If you use the *detail* option with the **query archive** or **query backup** commands, the client displays the following additional information:
- Last modification date
- Last access date

See "Query Archive" on page 384 and "Query Backup" on page 386 for more information.

Technical changes for version 5.1 - April 2002

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

Support for Cyclical Redundancy Checking (CRC)
Tivoli Storage Manager supports cyclical redundancy checking (CRC) to verify that data is not being corrupted in transfer during a backup or restore session.

Support for processing Network Attached Storage (NAS) file system images
Through support of Network Data Management Protocol (NDMP), Tivoli Storage Manager Windows NT, 2000, XP, AIX, and Solaris servers can efficiently back up and restore network attached storage (NAS) file system images to tape drives or libraries that are locally attached to the NAS file servers from Network Appliance. *NDMP support is available only on IBM Tivoli Storage Manager Extended Edition*. See "NDMP support requirements (Extended Edition only)" on page 1 for NDMP support requirements. See "Backing up NAS file systems" on page 87 for information on how to back up and restore NAS file system images using the Web client and command line client.

Support for logical volume backup as a single object (image backup) on Linux86 Client The Linux86 client is enhanced to support a logical volume image backup of file systems and raw volumes. The Tivoli Storage Manager server does not track individual files in the file system image. File system images are tracked as individual objects and management class policy will be applied to the file system image as a whole. See "Performing an image backup" on page 81 for more information.

Support for snapshot image backup of file systems and raw logical volumes on Linux86 Client
The traditional image backup prevents access to the volume by other system applications during the operation. For Linux86 *only*: Tivoli Storage Manager can perform an snapshot image backup of file systems residing on a logical volume created by the Linux Logical Volume Manager, during

which the volume is available to other system applications. See "Performing an image backup" on page 81 for more information.

Lan-free data movement support on HP-UX client
Tivoli Storage Manager supports LAN-Free data movement in a storage area network (SAN) environment for the HP-UX client. LAN-Free data movement allows client data to move directly from the client to a SAN-attached storage device. Shifting the client data movement from the communications network to a SAN decreases the load on the server. This allows the server to support a greater number of simultaneous client connections. See "LAN-free data movement" on page 71 for more information.

Enhanced web client interface
The Web client interface is enhanced to support a JRE 1.3.1 Swing-enabled browser. The Web client facilitates the use of assistive devices for users with disabilities and contains improved keyboard navigation. The native look and feel of the platform running the browser is preserved. See "Starting a Web client session" on page 63 for more information.

Support for the z/OS file system on the OS/390 client
Tivoli Storage Manager supports backup and restore of the z/OS file system on the OS/390 Client. See "Incremental" on page 375 for more information.

Support for the Sun Quick File System (QFS) 3.5.0 on the Solaris client
Tivoli Storage Manager supports backup, restore, archive and retrieve of the QFS file system on the Solaris client. QFS is a high-performance file system that enables file sharing in a SAN. It eliminates performance bottlenecks resulting from applications using very large file sizes. See "Incremental" on page 375 for more information.

Support for High Availability Cluster Multi Processing (HACMP) on AIX client
Tivoli Storage Manager supports HACMP failover on AIX. This allows the client to continue operating in the event of an HACMP node failover and fallback.

Multiple session no query restore
The backup-archive clients can now utilize multiple restore sessions for no query restore operations, increasing the speed of restores. This is similar to the multiple backup session support. It exploits the mount point available on the server. If data is backed up on multiple tapes, and if the server has multiple mount points available, then the restore starts a session for each tape, up to the number your administrator configures. See "Resourceutilization" on page 284 for more information.

Consistent client return codes
Reliable, consistent, and documented return codes have been added to the command line client and the scheduler. This facilitates automation of client operations via user-written scripts. By using the **QUERY EVENT** command with the *FORMAT=DETAILED* option, administrators can now distinguish between scheduled backups that completed successfully with no skipped files and scheduled backups that completed successfully with one or more skipped files. Also if you use the processing option **preschedulecmd** to run a command, and that command returns a non-zero return code, the scheduled event will not run. This ensures that scheduled events will not run if prerequisite commands do not complete successfully. See "Return codes from the command line interface" on page 131,

"Preschedulecmd/Prenschedulecmd" on page 272, and
"Postschedulecmd/Postnschedulecmd" on page 270 for more information.

Chapter 1. Installing Tivoli Storage Manager

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

You can access Tivoli Storage Manager backup and archive features:
- Locally through the native Graphical User Interface (Motif GUI)
- Locally through the Java Graphical User Interface (Java GUI)
- Locally through the client command line interface
- Remotely or locally through the Web client interface

Migrating from earlier versions

Upgrade path for clients and servers

As part of a migration plan from Tivoli Storage Manager version 5.1 to Tivoli Storage Manager version 5.2, Tivoli Storage Manager clients and servers can be upgraded at different times. To help prevent disruption to your backup and archive activities during the migration, note the following:

- A Tivoli Storage Manager version 5.1 client can perform backup, restore, archive, and retrieve functions to a Tivoli Storage Manager version 5.2 server.
- A Tivoli Storage Manager version 5.2 client can perform backup, restore, archive, retrieve, and query functions to a Tivoli Storage Manager version 5.1 server.
- A Tivoli Storage Manager V5.1 client can perform V3.1 functional level backup, restore, archive and retrieve functions to a Tivoli Storage Manager Version 3.1 server on VM.
- A Tivoli Storage Manager version 5.1 HSM client can perform migrate and recall functions to a Tivoli Storage Manager Version 5.2 server.
- A Tivoli Storage Manager version 5.2 HSM client can perform migrate and recall functions to a Tivoli Storage Manager version 5.1 server.
- If you back up, archive, or migrate data from a Tivoli Storage Manager version 5.2 client to any Tivoli Storage Manager server, you can restore, retrieve, or recall that data using a Tivoli Storage Manager version 5.1 client.
- If you back up, archive, or migrate data from a Tivoli Storage Manager version 5.1 client to any Tivoli Storage Manager server, you can restore, retrieve, or recall that data using a Tivoli Storage Manager version 5.2 client.
- All command line administrative clients can administer Tivoli Storage Manager version 5.1 and version 5.2 servers, and the V3.1 VM server.
- SAN storage agents and servers must be at the same level of code. When the server is upgraded, the storage agents which are using that particular server must be upgraded as well.

NDMP support requirements (Extended Edition only)

Through support of Network Data Management Protocol (NDMP), Tivoli Storage Manager can efficiently back up and restore NAS file systems to tape drives or

libraries that are locally attached to Network Appliance and EMC Celerra NAS file servers. *NDMP support is available only on IBM Tivoli Storage Manager Extended Edition.*

NDMP support requires the following hardware and software :
- Tivoli Storage Manager Version 4.2.1 AIX or Sun Solaris server or higher.
- Tivoli Storage Manager Version 4.2.1 Sun Solaris or AIX (32-bit and 64-bit) client or higher.
- Network Appliance or EMC Celerra NAS file servers. EMC Celerra file servers are supported on the Tivoli Storage Manager Version 5.2 client and server only. For supported models and operating systems, refer to:

  `http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html`
- Tape drive and tape library. For supported combinations, refer to:

  `http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html`

See "Backing up NAS file systems" on page 87 for further information, including how to back up and restore NAS file system images using the Web client and command line client.

Additional migration information

When you install the Web client, you must install the Web client language files that correspond to those languages you want to use.

A command line administrative client is available on all client platforms. The primary intended interface to the server is the Web administrative interface and requires a Web browser. The Web administrative interface is packaged and installed with the server. For more information about the command line administrative client and the Web administrative interface, see "Related publications" on page xv for the appropriate Tivoli Storage Manager Administrator's Reference.

Client environment requirements

This section contains Tivoli Storage Manager client environment information, components, and hardware and software requirements for the UNIX platforms. Table 3 lists the location of the environment prerequisites for each supported platform.

Attention: For current information concerning the client environment prerequisites for all Tivoli Storage Manager supported client platforms, refer to the `README` file that is shipped on the product installation media or go to the Web site at:

`http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html`

Table 3. Client requirements

Operating system	Page
AIX client environment	3
HP-UX client environment	4
Linux on Intel x86 client environment	5
Linux on Intel Itanium client environment	7
Linux for pSeries and Linux for iSeries client environments	8
Linux for IBM eServer zSeries and S/390 client environments	9

Table 3. Client requirements (continued)

Operating system	Page
OS/390 and z/OS UNIX System Services client environment	10
Solaris client environment	11

AIX client environment

This section contains client environment information, Tivoli Storage Manager client components, and hardware and software requirements for the AIX platform.

Client components
- Backup-archive client (command line)
- Administrative client (command-line)
- Backup-archive Java Graphical User Interface (Java GUI)
- Backup-archive Native Graphical User Interface (Motif GUI)
- Web backup-archive client
- Tivoli Storage Manager API (32-bit and 64-bit)
- XOpen API (32-bit)
- AFS/DFS (on AFS 3.6, DFS 3.1) at V5.1 functional level
- Hierarchical Storage Management client

Notes:

1. The V5.2 IBM Tivoli Space Manager HSM Client and documentation for AIX, while contained on this client CD, is a separate product, and therefore subject to the fees and licensing required by Tivoli and IBM.

2. For more information about the Tivoli Storage Manager API and X/Open API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.

3. For more information about the Administrative client, see *IBM Tivoli Storage Manager for AIX Administrator's Reference*, GC32-0769

4. For more information about the Hierarchical Storage Management client, see *IBM Tivoli Storage Manager for Space Management for UNIX User's Guide*, GC32-0794

Hardware requirements
- A RISC System/6000 or pSeries
- Disk space: see the README file that is shipped on the product installation media
- Memory: 128 MB
- A minimum screen resolution of 800 by 600 pixels is required to display the Tivoli Storage Manager Backup-Archive Client GUI and Web GUI.

For HACMP:

Machine:
- At least two identical pSeries (RS/6000)
- One additional network adapter for each machine
- Memory: 128 MB

Software requirements
- Backup-Archive client
    AIX 5.1 (32-bit and 64-bit)
        bos.rte 5.1.0.15 or higher
        bos.rte.libc 5.1.0.11 or higher
        bos.rte.libpthreads 5.1.0.17 or higher

AIX 5.2 (32-bit and 64-bit)
    bos.rte.libpthreads 5.2.0.10 or higher
    bos.rte 5.2.0.11 (Maintenance Level 2) or higher
HACMP support: AIX 5.1 (32-bit and 64-bit kernel), AIX 5.2 (32-bit and 64-bit kernel), HACMP 4.4 or higher

- X Window System X11R6
- Motif 1.2 or 2.0
- Common Desktop Environment (CDE) (for end user GUI only)
- Java JRE 1.3.1 or higher for the Web client and Java GUI
- A Netscape 4.7 or higher browser, Microsoft Internet Explorer 5.0 or higher browser, or Mozilla 1.4

Communication methods

To use this communication method:	Install this software:	To connect to these Tivoli Storage Manager servers:
TCP/IP	TCP/IP (Standard with supported AIX/6000 platforms)	AIX, HP-UX, Linux, OS/390, OS/400 PASE, Solaris, VM, Windows, z/OS
Shared Memory	TCP/IP (Standard with supported AIX platforms)	AIX

HP-UX client environment

This section contains client environment information, Tivoli Storage Manager client components, and hardware and software requirements for the HP-UX platform.

Client components
- Backup-archive client (command-line and GUI)
- Administrative client (command line)
- Backup-archive Java Graphical User Interface (Java GUI)
- Backup-archive Native Graphical User Interface (Motif GUI)
- Tivoli Storage Manager API
- X/Open API
- Web backup-archive client
- Hierarchical Storage Management client

Notes:

1. The V5.2.2 IBM Tivoli Space Manager HSM Client and documentation for HP-UX, while contained on the client CD, is a separate product, and therefore subject to the fees and licensing required by Tivoli and IBM.

2. For more information about the Hierarchical Storage Management client, see *IBM Tivoli Storage Manager for Space Management for UNIX User's Guide*, GC32-0794

3. For more information about the Tivoli Storage Manager API and X/Open API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.

4. For more information about the Administrative client, see *IBM Tivoli Storage Manager for HP-UX Administrator's Reference*, GC32-0773

Hardware requirements
- An HP 9000 Series 700 or 800 workstation or server
- Disk space: 70 MB; see the README file that is shipped on the product installation media

- Memory: 256 MB
- A minimum screen resolution of 800 by 600 pixels is required to display the Tivoli Storage Manager Backup-Archive Client GUI and Web GUI.

Software requirements
- HP-UX 11.0 (32-bit or 64-bit), HP-UX 11.11 (11i Version 1.0) (32-bit or 64-bit)
- X Windows System X11R6
- Motif 2.0
- Common Desktop Environment (CDE) (for end user GUI only)

  Note: CDE online help facility libraries: libDtHelp.sl and libDtSvc.sl, typically located in /usr/dt/lib.
- Java JRE 1.3.1 or higher for the Web client and Java GUI
- A Netscape 4.7 or higher browser or Microsoft Internet Explorer 5.0
- Hierarchical Storage Management client: Veritas Filesystem 3.5 (VxFS), Veritas Volume Manager 3.5 (VxVM), OnlineJFS 3.3 or 3.5

  Note: The V5.2.2 IBM Tivoli Space Manager HSM Client and documentation for HP-UX, while contained on the client CD, is a separate product, and therefore subject to the fees and licensing required by Tivoli and IBM.

Communications methods

To use this communication method:	Install this software:	To connect to these Tivoli Storage Manager servers:
TCP/IP	TCP/IP (Standard with HP-UX)	AIX, HP-UX, Linux, OS/390, OS/400 PASE, Solaris, VM, Windows, z/OS
Shared Memory	TCP/IP (Standard with HP-UX)	HP-UX

Linux on Intel x86 client environment

This section contains client environment information, Tivoli Storage Manager client components, and hardware and software requirements for the Linux on Intel x86 (Linux86) platform.

Client components
- Backup-archive client (command line)
- Administrative client (command line)
- Backup-archive Java Graphical User Interface (Java GUI)
- Backup-archive Native Graphical User Interface (Motif GUI)
- Tivoli Storage Manager API
- Web backup-archive client
- Hierarchical Storage Management client

Notes:

1. The V5.2 IBM Tivoli Space Manager HSM Client and documentation for Linux86, while contained on the client CD, is a separate product, and therefore subject to the fees and licensing required by Tivoli and IBM.

2. For more information about the Tivoli Storage Manager API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.

3. For more information about the Administrative client, see *IBM Tivoli Storage Manager for Linux Administrator's Reference*, GC23-4691

4. For more information about the Hierarchical Storage Management client, see *IBM Tivoli Storage Manager for Space Management for UNIX User's Guide*, GC32-0794

Hardware requirements
- X86 based PC architecture (Pentium or higher)
- Disk space: see the README file that is shipped on the product installation media
- Memory: 128 MB
- A minimum screen resolution of 800 by 600 pixels is required to display the Tivoli Storage Manager Backup-Archive Client GUI and Web GUI.

Software requirements
The backup-archive client requires the following software to run:
- Linux kernel 2.4.2 or higher
- glibc 2.2.2 or higher
- libstdc++2.9.6 or higher
- For GPFS ACL support on Linux86, the Tivoli Storage Manager client uses libgpfs.so library (which comes in the standard GPFS package), so it is searched for in the following locations:
  - A colon-separated list of directories in the user's LD_LIBRARY_PATH environment variable.
  - The list of libraries cached in /etc/ld.so.cache.
  - /usr/lib, followed by /lib.
- X Window System X11R6 (for end user GUI only)
- RPM 3.0.0 or higher, 4.0
- Java JRE 1.3.1 or higher for the Web client and Java GUI
- A Netscape 4.7 or higher browser or Microsoft Internet Explorer 5.0 or higher browser

Note: Please note that X Windows System X11R6 is a requirement to install the client. If it is not installed and you do not plan to use the end user GUI, you have to add the --nodeps option of rpm to disable the check for requirements.

Please use one of the following Window Manager Systems:
- Gnome
- KDE 2
- Exceed

Note: KDE 2 does not display window frames for some windows.

Linux distributions that meet these requirements include:
- SuSE 8.0, 8.1, SLES 8
- RedHat 7.3, 8.0, 9.0, and Advanced Server v.2.1
- RedHat Enterprise Linux 3.0 (you must install the compat-gcc-c++-7.3-2.96.122.i386.rpm)
- Turbo Linux 7.5 and 8.0
- United Linux 1.0

Note: The Linux86 client was certified by Tivoli for these distributions. Please verify for other distributions that the software requirements listed above are fulfilled.

Communication methods

To use this communication method:	Install this software:	To connect to these Tivoli Storage Manager servers:
TCP/IP	TCP/IP (Standard with Linux)	AIX, HP-UX, Linux, OS/390, OS/400 PASE, Solaris, VM, Windows, z/OS

Linux on Intel Itanium client environment

This section contains client environment information, Tivoli Storage Manager client components, and hardware and software requirements for the Linux on Intel Itanium (Linux IA64) platform.

Client components
- Backup-archive client (command line)
- Administrative client (command line)
- Backup-archive Java Graphical User Interface (Java GUI)
- Tivoli Storage Manager API
- Web backup-archive client

Notes:

1. For more information about the Tivoli Storage Manager API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.

2. For more information about the Administrative client, see *IBM Tivoli Storage Manager for Linux Administrator's Reference*, GC23-4691

Hardware requirements
- IA-64 based PC architecture
- Disk space: see the README file that is shipped on the product installation media
- Memory: 128 MB
- A minimum screen resolution of 800 by 600 pixels is required to display the Tivoli Storage Manager Backup-Archive Client GUI and Web GUI.

Software requirements
The backup-archive client requires the following software to run:
- Linux kernel 2.4.19 or higher
- glibc 2.2.5 or higher
- libstdc++ 3.2.29 or higher
- RPM 3.0.0 or higher, 4.0
- Java JRE 1.3.1 or higher for the Web client and Java GUI
- A Netscape 4.7 or higher browser, Microsoft Internet Explorer 5.0 or higher browser, or Mozilla 1.4

Linux distributions that meet these requirements include:
- SLES 8
- RedHat Enterprise Linux 3.0

Note: The Linux IA64 client is certified by Tivoli for these distributions. Please verify for other distributions that the software requirements listed above are fulfilled.

Communication methods

To use this communication method:	Install this software:	To connect to these Tivoli Storage Manager servers:
TCP/IP	TCP/IP (Standard with Linux)	AIX, HP-UX, Linux, OS/390, OS/400 PASE, Solaris, VM, Windows, z/OS

Linux for pSeries and Linux for iSeries client environments

This section contains client environment information, Tivoli Storage Manager client components, and hardware and software requirements for the Linux for pSeries (Linux pSeries client) and Linux for iSeries (Linux iSeries client) platforms.

Client components
- Backup-archive client (command-line)
- Administrative client (command line)
- Backup-archive Java Graphical User Interface (Java GUI)
- Backup-archive Native Graphical User Interface (Motif GUI)
- Tivoli Storage Manager API
- Web backup-archive client

Notes:
1. See the README file that is shipped on the product installation media for requirements to run the application programming interface client.

2. For more information about the Tivoli Storage Manager API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.

3. For more information about the Administrative client, see *IBM Tivoli Storage Manager for Linux Administrator's Reference*, GC23-4691

Hardware requirements
- Any Power PC
- Disk space: see the README file that is shipped on the product installation media
- Memory: 128 MB
- A minimum screen resolution of 800 by 600 pixels is required to display the Tivoli Storage Manager Backup-Archive Client GUI and Web GUI.

Software requirements
The backup-archive client requires the following software to run:
- Linux kernel 2.4.19 or higher
- glibc 2.2.5 or higher
- libstdc++ 3.2 or higher
- RPM 3.0.6 or higher, 4.0
- Java JRE 1.3.1 or higher for the Web client
- A Netscape 4.7 or higher browser, Microsoft Internet Explorer 5.0 or higher browser, or Mozilla 1.4

Please use one of the following Window Manager Systems:
- Gnome
- KDE 2
- Exceed

Note: KDE 2 does not display window frames for some windows.

Linux distributions that meet these requirements include:
- SuSE 8.0

Note: The Linux for pSeries client was certified by Tivoli for this distribution. Please verify for other distributions that the software requirements listed above are fulfilled.

Communication methods

To use this communication method:	Install this software:	To connect to these Tivoli Storage Manager servers:
TCP/IP	TCP/IP (Standard with Linux)	AIX, HP-UX, Linux, OS/390, OS/400 PASE, Solaris, VM, Windows, z/OS

Linux for IBM eServer zSeries and S/390 client environments

This section contains client environment information, Tivoli Storage Manager client components, and hardware and software requirements for the Linux for zSeries and S/390 (Linux390) platform.

Client components
- Backup-archive client (command line)
- Administrative client (command line)
- Tivoli Storage Manager API (32-bit and 64-bit)
- Web backup-archive client

Notes:

1. For more information about the Tivoli Storage Manager API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.

2. For more information about the Administrative client, see *IBM Tivoli Storage Manager for Linux Administrator's Reference*, GC23-4691

Hardware requirements
- A 9672 G5 or G6, Multiprise 3000, or zSeries 800 or 900 (31-bit and 64-bit mode)
- Disk space: see the README file that is shipped on the product installation media.
- Memory: 128 MB
- A minimum screen resolution of 800 by 600 pixels is required to display the Tivoli Storage Manager Backup-Archive Client Web GUI.

Software requirements
The backup-archive client requires the following software to run:
- Linux kernel 2.4.7 or higher
- glibc 2.2.2 or higher
- libstdc++2.10.0 or higher
- RPM 3.0.6 or higher
- Java JRE 1.3.1 or higher for the Web client
- Netscape Navigator 4.7 or Microsoft Internet Explorer 5.0 or higher

The Linux distributions that fulfill these requirements include:
- SuSe Linux Enterprise Server 7 and 8 for S390 and zSeries

Note: The Linux z/series and S/390 was certified by Tivoli for this distribution. Please verify for other distributions that the software requirements listed above are fulfilled.

Communication methods

To use this communication method:	Install this software:	To connect to these Tivoli Storage Manager servers:
TCP/IP	TCP/IP (Standard with Linux)	AIX, HP-UX, Linux, OS/390, OS/400 PASE, Solaris, VM, Windows, z/OS

OS/390 and z/OS UNIX System Services client environment

This section contains client environment information, Tivoli Storage Manager client components, and hardware and software requirements for the OS/390 and z/OS UNIX System Services platform.

Client components
- Backup-archive client (command-line)
- Administrative client (command-line)
- Tivoli Storage Manager API
- Web backup-archive client

Notes:

1. For more information about the Tivoli Storage Manager API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.

2. For more information about the Administrative client, see *IBM Tivoli Storage Manager for OS/390 and z/OS Administrator's Reference*, GC32-0776

Hardware requirements
- Any System/390 or zSeries architecture CPU
- Disk space: see the README file that is shipped on the product installation media.
- A minimum screen resolution of 800 by 600 pixels is required to display the Tivoli Storage Manager Backup-Archive Client Web GUI.

Software requirements
- OS/390 V2R10 with SMP/E
- z/OS V1R1, z/OS V1R2, z/OS V1R3, or z/OS V1R4
- Java JRE 1.3.1 or higher for the Web client

Communication methods

To use this communication method:	Install this software:	To connect to these Tivoli Storage Manager servers:
TCP/IP	IBM TCP/IP	AIX, HP-UX, Linux, OS/390, OS/400 PASE, Solaris, VM, Windows, z/OS

Solaris client environment

This section contains client environment information, Tivoli Storage Manager client components, and hardware and software requirements for the Sun Solaris platform.

Client components
- Backup-archive client (command line)
- Administrative client (command-line)
- Backup-archive Java Graphical User Interface (Java GUI)
- Backup-archive Native Graphical User Interface (Motif GUI)
- Tivoli Storage Manager API
- X/Open API
- Web backup-archive client
- Hierarchical Storage Management client

Notes:

1. The V5.2 IBM Tivoli Space Manager HSM Client and documentation for Solaris, while contained on the client CD, is a separate product, and therefore subject to the fees and licensing required by Tivoli and IBM.

2. For more information about the Tivoli Storage Manager API and X/Open API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.

3. For more information about the Administrative client, see *IBM Tivoli Storage Manager for Sun Solaris Administrator's Reference*, GC32-0779

4. For more information about the Hierarchical Storage Management client, see *IBM Tivoli Storage Manager for Space Management for UNIX User's Guide*, GC32-0794

Hardware requirements
- A SPARCstation or compatible workstation
- Disk space: see the README file that is shipped on the product installation media
- Memory: 128 MB
- A minimum screen resolution of 800 by 600 pixels is required to display the Tivoli Storage Manager Backup-Archive Client GUI and Web GUI.

Software requirements
One of the following operating systems:
- Sun Solaris 7 - 32-bit or 64-bit kernel mode
- Sun Solaris 8 - 32-bit or 64-bit kernel mode
- Sun Solaris 9 - 32-bit or 64-bit kernel mode

The backup-archive client GUI requires:
- X Window System X11R6
- Motif 2.0
- CDE online help facility libraries: libDtHelp.sl and libDtSvc.sl, typically located in /usr/dt/lib
- Java JRE 1.3.1 or higher for the Web client and Java GUI
- Netscape Navigator 4.7 or Microsoft Internet Explorer 5.0 or higher

Communication methods

To use this communication method:	Install this software:	To connect to these Tivoli Storage Manager servers:
TCP/IP	TCP/IP (Standard with Solaris)	AIX, HP-UX, Linux, OS/390, OS/400 PASE, Solaris, VM, Windows, z/OS
Shared Memory	TCP/IP (Standard with Solaris)	Solaris

Client installation media on product CD-ROMs

The client images are contained on the following Tivoli Storage Manager product CD-ROMs:

IBM Tivoli Storage Manager AIX Clients
> Contains the AIX 32bit and AIX 64bit client images. The AIX client images are in the /usr/sys/inst.images directory

IBM Tivoli Storage Manager UNIX Clients (non-AIX)
> Contains the HP-UX, Linux86, Linux390, Linuxppc, Linux IA64, and Solaris client images. The images reside in the tsmcli/'platform'/ directory structure, where 'platform' is one of the following platform designations: **hp11, Linux86, linux390, linuxppc (for Linux pSeries and Linux iSeries clients), linuxIA64, solaris**.

See the following publications for information about available OS/390 UNIX client installation media:
- *Program Directory for IBM Tivoli Storage Manager, S/390 Edition Backup-Archive Client* (5698-ISE, order number GI11-0874)
- *Program Directory for IBM Tivoli Storage Manager, S/390 Edition Backup-Archive Client* (5697-ISE), order number GI11-0922
- *Program Directory for IBM Tivoli Storage Manager, S/390 Edition Backup-Archive Client* (5698-ISM, order number GI11-0875)
- *Program Directory for IBM Tivoli Storage Manager, S/390 Edition Backup-Archive Client* (5697-ISM), order number GI11-0912
- *Program Directory for IBM Tivoli Storage Manager, S/390 API* (5698-ISE), order number GI11-0872
- *Program Directory for IBM Tivoli Storage Manager, S/390 API* (5697-ISE), order number GI11-0921
- *Program Directory for IBM Tivoli Storage Manager, S/390 API* (5698-ISM), order number GI11-0873
- *Program Directory for IBM Tivoli Storage Manager, S/390 API* (5697-ISM), order number GI11-0911

You can install the clients using any of the following methods:
- Install directly from the CD-ROM.
- Create client images to install.
- Transfer installable files from the UNIX CD-ROMs to a target workstation.

Online startup information

You can display online startup information, product manuals, and READMEs. On a Web browser:
1. Click **File** and then click **Open File**.

2. Select the CD-ROM drive.
3. Select the **START.HTM** file.

Installing the backup-archive client

This section provides instructions to install and set up Tivoli Storage Manager UNIX clients.

Note: A root user *must* install Tivoli Storage Manager on a UNIX workstation.

After installation completes, see Chapter 2, "Configuring Tivoli Storage Manager," on page 33 for required and optional tasks to perform before using Tivoli Storage Manager.

Table 4 lists the supported UNIX clients and the location of the installation instructions for each client.

Table 4. Unix client installation reference

Installation instructions	Page
Installing the AIX client	14
Installing the HP-UX clients	17
Installing the Linux86 client	20
Installing the Linux on Intel Itanium client	22
Installing the Linux390 client	24
Installing the Linux pSeries and Linux iSeries clients	26
For information on Installing the OS/390 and z/OS UNIX System Services Client, see the following publications: • *Program Directory for IBM Tivoli Storage Manager, S/390 Edition Backup-Archive Client* (5698-ISE, order number GI11-0874) • *Program Directory for IBM Tivoli Storage Manager, S/390 Edition Backup-Archive Client* (5697-ISE), order number GI11-0922 • *Program Directory for IBM Tivoli Storage Manager, S/390 Edition Backup-Archive Client* (5698-ISM, order number GI11-0875) • *Program Directory for IBM Tivoli Storage Manager, S/390 Edition Backup-Archive Client* (5697-ISM), order number GI11-0912 • *Program Directory for IBM Tivoli Storage Manager, S/390 API* (5698-ISE), order number GI11-0872 • *Program Directory for IBM Tivoli Storage Manager, S/390 API* (5697-ISE), order number GI11-0921 • *Program Directory for IBM Tivoli Storage Manager, S/390 API* (5698-ISM), order number GI11-0873 • *Program Directory for IBM Tivoli Storage Manager, S/390 API* (5697-ISM), order number GI11-0911	
Installing the Solaris clients	28

Installing the AIX client

Attention: For current installation and configuration information for the Tivoli Storage Manager product, refer to the `README` file that is shipped on the product installation media. For current information concerning Tivoli Storage Manager, supported platforms, and documentation, refer to the Web site at:

`http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html`

Follow these guidelines to determine which Tivoli Storage Manager client version (32-bit or 64-bit) is appropriate for your environment:

1. On systems running 32-bit AIX kernel on 32-bit processors, install only the 32-bit Tivoli Storage Manager client.

2. On systems running 32-bit AIX kernel on 64-bit processors, it is recommended that you install the 32-bit Tivoli Storage Manager client. However, if you do not plan to install Tivoli Space Manager, you may install the 64-bit Tivoli Storage Manager client instead, to take advantage of increased space addressability.

3. On systems running 64-bit AIX kernel, install only the 64-bit Tivoli Storage Manager client.

4. On systems running 64-bit AIX kernel, using the 32-bit Tivoli Storage Manager client is not certified or supported.

Table 5 illustrates these guidelines.

Table 5. Guidelines to determine which Tivoli Storage Manager client version (32-bit or 64-bit) is appropriate for your environment

TSM Client Package	AIX Systems with 32-bit Kernel		AIX Systems with 64-bit Kernel	
	32-bit h/w	64-bit h/w	64-bit h/w	32-bit h/w N/A
32-bit client	Recommended (supported)	Recommended (supported)	Allowed (not supported)	N/A
64-bit client	Not allowed (not supported)	Allowed (supported)	Recommended (supported)	N/A

The following packages are available on the installation media in the `/usr/sys/inst.images` directory:

AIX 32-bit client

  tivoli.tsm.client.ba.32bit

    Installs the Tivoli Storage Manager common files, client files (command-line and GUI), administrative client (command-line), NAS backup component, image backup component, and the Web client.

  tivoli.tsm.msg.*lang*.client.ba.32bit

    Installs NL messages for the Backup-Archive client. Where *lang* is the appropriate language code from Table 6 on page 15. American English messages are already included in the backup-archive client code.

  tivoli.tsm.client.api.32bit

    Installs the 32-bit API.

  tivoli.tsm.msg.*lang*.client.api.32bit

    Installs the NL messages for API. Where *lang* is the appropriate language code from Table 6 on page 15. American English messages are already included in the API client code.

  tivoli.tsm.books.en_US.client.htm

    Installs the HTML book files.

  tivoli.tsm.books.en_US.client.pdf

    Installs the PDF book files.

tivoli.tsm.client.hsm.jfs.32bit
> Hierarchical Storage Management.

tivoli.tsm.msg.lang.client.hsm.32bit
> Installs NL messages for Hierarchical Storage Management. Where *lang* is the appropriate language code from Table 6. American English messages are already included in the Hierarchical Storage Management code.

tivoli.tsm.books.en_US.client.hsm.htm
> Installs the HTML book files.

tivoli.tsm.books.en_US.client.hsm.pdf
> Installs the PDF book files.

AIX 64-bit client

tivoli.tsm.client.ba.64bit
> Installs the Tivoli Storage Manager common files, client files (command-line and GUI), administrative client (command-line), NAS backup component, image backup component, and the Web client.

tivoli.tsm.msg.*lang*.client.ba.64bit
> Installs NL messages for the Backup-Archive client. Where *lang* is the appropriate language code from Table 6. American English messages are already included in the backup-archive client code.

tivoli.tsm.client.api.64bit
> Installs the 64-bit API.

tivoli.tsm.msg.*lang*.client.api.64bit
> Installs the NL messages for API. Where *lang* is the appropriate language code from Table 6. American English messages are already included in the API client code.

tivoli.tsm.books.en_US.client.htm
> Installs the HTML book files.

tivoli.tsm.books.en_US.client.pdf
> Installs the PDF book files.

tivoli.tsm.msg.*lang*.client.hsm.64bit
> Hierarchical Storage Management.

tivoli.tsm.msg.*lang*.client.hsm.64bit
> Installs the NL messages for Hierarchical Storage Management. Where *lang* is the appropriate language code from Table 6. American English messages are already included in the Hierarchical Storage Management code.

tivoli.tsm.books.en_US.client.hsm.htm
> Installs the HTML book files.

tivoli.tsm.books.en_US.client.hsm.pdf
> Installs the PDF book files.

Table 6. AIX client: Language codes for installation packages

Language	Language code
Simplified Chinese	zh_CN
Traditional Chinese	zh_TW, Zh_TW
Czech	cs_CZ
French	fr_FR
German	de_DE
Hungarian	hu_HU
Italian	it_IT
Japanese	ja_JP, Ja_JP
Korean	ko_KR
Polish	pl_PL

Table 6. AIX client: Language codes for installation packages (continued)

Language	Language code
Brazilian Portuguese	pt_BR
Russian	ru_RU
Spanish	es_ES

This installation procedure is designed to install directly from the CD-ROM using a local or remote-mounted CD-ROM drive.

If you are copying the client files into a local directory first, a .toc file is automatically created by the installp command. You can create a .toc file manually by running /usr/sbin/inutoc in the local directory to which you copied the Tivoli Storage Manager image. From the AIX command line, enter:

```
/usr/sbin/inutoc /usr/sys/inst.images
```

A **.toc** file is created in that directory.

To install Tivoli Storage Manager from the CD-ROM:
1. Log in as the root user, insert the CD-ROM into the CD-ROM drive device. You will need to manually mount the CD-ROM device for remote or NFS installations.
2. From the AIX command line, type **smitty install** and press Enter.
3. Select **Install and Update Software** and press Enter.
4. Select **Install and Update From ALL Available Software** and press Enter.
5. At the **INPUT device/directory for software** prompt, press the F4 key and select the CD-ROM device containing the installation CD-ROM or specify the directory containing the installation images, and press Enter.
6. At the **SOFTWARE to install** prompt, press the F4 key. Select the Tivoli Storage Manager filesets you want to install and press Enter.
7. Select the options you want and press Enter to begin the installation.

The Tivoli Storage Manager files are installed in the /usr/tivoli/tsm/client/ba/bin directory. If you move the Tivoli Storage Manager files to another directory, you must perform the following steps:
1. Make sure the permissions of the installed files have not changed.
2. Update the symbolic links for the installed files in the following directories:
   - The /usr/bin directory
   - The /usr/lib directory for Tivoli Storage Manager libraries
   - The directory that contains symbolic links for each language package you install (for example, /usr/lib/nls/msg/en_US).
3. Ensure that every user of Tivoli Storage Manager sets the DSM_DIR environment variable to the newly installed directory.

After installation completes, see Chapter 2, "Configuring Tivoli Storage Manager," on page 33 for required and optional tasks to perform before using Tivoli Storage Manager.

Installing the HP-UX clients

Attention: For current installation and configuration information for the Tivoli Storage Manager program product, refer to the `README` file that is shipped on the product installation media. For current information concerning Tivoli Storage Manager, supported platforms, and documentation, refer to the Web site at:

`http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html`

The following source packages are available on the installation media:

`tsmcli/hp11/TIVsmC`

In this package the software selection name used by swlist for the top level product name is `TIVsm`. The components under `TIVsm` are `TIVsm.CLIENT`, `TIVsm.CLIENT_API`, and `TIVsm.CLIENT_DOC`.

`TIVsm.CLIENT`
Contains the backup-archive client (command-line and GUI), administrative client (command-line), and the Web client with the English message catalogues.

`TIVsm.CLIENT_API`
Contains the 32-bit API with the English message catalogues.

`TIVsm.CLIENT_DOC`
Contains the documentation.

Note: Additional language support is available under the top level product name of **TIVsmC.msg.*lang***, with component names **TIVsm.CLIENT_msg_*lang*** and **TIVsm.CLIENT_API_*lang***. Replace *lang* with the appropriate language code from Table 7.

`tsmcli/hp11/TIVsmCapi64`

In this package the software selection name used by swlist for the top level product name is `TIVsm64`. The component under `TIVsm64` is `TIVsm.CLIENT_API64`.

`TIVsm.CLIENT_API64`
Contains the 64-bit API with the English message catalogues.

Note: Additional language support is available under the top level product name of **TIVsm64**. The component under this is **TIVsm.CLIENT_API64_*lang***. Replace *lang* with the appropriate language code from Table 7.

`tsmcli/hp11/TIVsmCapi`

In this package the software selection name used by swlist for the top level product name is `TIVsm`. The component under `TIVsm` is `TIVsm.CLIENT_API`.

`TIVsm.CLIENT_API`
Contains the 32-bit API with the English message catalogues.

Note: Additional language support is available under the top level product name of **TIVsm**. The component under this is **TIVsm.CLIENT_API_*lang***. Replace *lang* with the appropriate language code from Table 7.

Table 7. HP-UX client: Language codes for installation packages

Language	Language code
Simplified Chinese	zh_CN
Traditional Chinese	zh_TW

Table 7. HP-UX client: Language codes for installation packages (continued)

Language	Language code
Czech	cs_CZ
French	fr_FR
German	de_DE
Hungarian	hu_HU
Italian	it_IT
Japanese	ja_JP
Korean	ko_KR
Polish	pl_PL
Brazilian Portuguese	pt_BR
Russian	ru_RU
Spanish	es_ES

To remove previous ADSM client versions, log in as the root user and enter the following command:

```
/usr/sbin/swremove -x mount_all_filesystems=false -v IBMADSM
```

To remove previous Tivoli Storage Manager client versions, log in as the root user and enter the following command:

```
/usr/sbin/swremove -x mount_all_filesystems=false -v TIVsm.CLIENT
```

If you installed the CLIENT_API and CLIENT_DOC filesets, execute the following command to remove them:

```
/usr/sbin/swremove -x mount_all_filesystems=false -v
TIVsm.CLIENT_API TIVsm.CLIENT_DOC
```

If you installed additional languages, execute the following command to remove them:

```
/usr/sbin/swremove -x mount_all_filesystems=false -v \ TIVsm.CLIENT_msg_lang
TIVsm.CLIENT_API_lang
```

Replace *lang* with the appropriate language code from Table 7 on page 17

To install from the CD-ROM, log in as the root user, mount the CD-ROM to /cdrom, and change directory to `tsmcli/hp11`. If you downloaded from ftp, go to the directory where the installable image is located. Enter the following command:

```
/usr/sbin/swinstall -x mount_all_filesystems=false -v -s 'pwd'/
TIVsmC TIVsm
```

Note: '*pwd*' may be used instead of the absolute name of the current directory.

To install only the API or the documentation, omit the last `TIVsm` from the command above, and mark only the fileset for installation in the swinstall user interface you want to install:
- CLIENT (for the backup-archive client)
- CLIENT_API (for the API)
- CLIENT_DOC (for the documentation)

Note: The Client needs the API for Raw Logical Volume backup. Therefore if you mark CLIENT for installation the API is also installed.

To install additional languages, execute the following commands:

```
usr/sbin/swinstall -x mount_all_filesystems=false -v -s \ 'pwd' /
TIVsmC.msg.lang TIVsm.CLIENT_msg_lang
TIVsm.CLIENT_API_lang
-or-
swinstall -x mount_all_filesystems=false -v -s 'pwd'/TIVsmCapi64.msg.lang
TIVsm.CLIENT_API64_lang
```

Notes:

1. '*pwd*' may be used instead of the absolute name of the current directory.

2. Replace *lang* with the appropriate language code from Table 7 on page 17.

During installation:

- The Tivoli Storage Manager backup-archive and Web client files are installed in the `/opt/tivoli/tsm/client/ba/bin` directory.
- The administrative client (dsmadmc) is installed in `/opt/tivoli/tsm/client/admin/bin`.
- The Tivoli Storage Manager API files are installed in the `/opt/tivoli/tsm/client/api/bin` directory.
- The Tivoli Storage Manager API 64 files are installed in the `/opt/tivoli/tsm/client/api/bin64` directory.
- The Tivoli Storage Manager documentation files are installed in `/opt/tivoli/tsm/client/books`.

Increasing default limit of data segment size: The default limit of the data segment size of a process in HP-UX 11.0 is 64 MB. When backing up large file systems, the Tivoli Storage Manager client may exceed this limit and run out of memory. To increase this limit you can modify the kernel as follows:

1. As root user, start **sam**.
2. Select **Kernel Configuration**.
3. Select **Configurable Parameters**.
4. Locate **maxdsize** and increase its value through the menu entry **Actions/Modify Configurable Parameter...** (e.g. set maxdsize to 268435456 for a 256 MB max size of the data segment.
5. The kernel is rebuilt by **sam** after this change. You must reboot for the new setting to take effect.

After installation completes, see Chapter 2, "Configuring Tivoli Storage Manager," on page 33 for required and optional tasks to perform before using Tivoli Storage Manager.

Installing the Linux86 client

Attention: For current installation and configuration information for the Tivoli Storage Manager program product, refer to the README file that is shipped on the product installation media. For current information concerning Tivoli Storage Manager, supported platforms, and documentation, refer to the Web site at:

`http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html`

The following installation options are available in uncompressed packages on the CD:

`tsmcli/linux86/TIVsm-BA.i386.rpm`
Installs the backup-archive client (command-line and GUI), administrative client (command-line), the Web client, and documentation.

> **Note:** Additional language support is available with component names **TIVsm-BA.msg.*lang*.i386.rpm**. Replace *lang* with the appropriate language code from Table 8 on page 21.

`tsmcli/linux86/TIVsm-API.i386.rpm`
Installs the Application Programming Interface (API) containing the Tivoli Storage Manager API shared libraries and samples.

> **Note:** Additional language support is available with component names **TIVsm-API.msg.*lang*.i386.rpm**. Replace *lang* with the appropriate language code from Table 8 on page 21.

To delete previously installed Tivoli Storage Manager client packages, log in as root and enter:

```
   rpm -e TIVsm-BA
and for the API:
   rpm -e TIVsm-API
```

If an additional Language package is installed, you must uninstall it first:

```
rpm -e TIVsm-BA.msg.lang
rpm -e TIVsm-API.msg.lang
```

Replace *lang* with the appropriate language code from Table 8 on page 21.

Note: The package version number is not needed for uninstall.

Use the following procedure to install the Tivoli Storage Manager clients:

1. Log in as the root user and mount the CD-ROM to `/cdrom`.
2. Enter the following directory path where the installation packages reside on the CD:

   `/cdrom/tsmcli/linux86`

3. Enter the following commands to install the backup-archive client (command-line, API, and GUI), the administrative client (command-line), and the Web client:

   ```
   First:
   rpm -i TIVsm-API.i386.rpm
   Then:
   rpm -i TIVsm-BA.i386.rpm
   ```

   To circumvent the dependence check, use the --nodeps option. Please be aware to check the dependencies manually:

```
First:
rpm -i --nodeps TIVsm-API.i386.rpm
Then:
rpm -i --nodeps TIVsm-BA.i386.rpm
```

> **Note:** The backup-archive client requires the API package to perform image backups.

4. To install additional language support (the default is American English), enter the following commands:

```
rpm -i TIVsm-API.msg.lang.i386.rpm
rpm -i TIVsm-BA.msg.lang.i386.rpm
```

Replace *lang* with the appropriate language code from Table 8.

Table 8. Linux86 client: Language codes for installation packages

Language	Language code
Simplified Chinese	zh_CN, zh_CN.GB18030
Traditional Chinese (Big5)	zh_TW
Czech	cs_CZ
French	fr_FR
German	de_DE
Hungarian	hu_HU
Italian	it_IT
Japanese	ja_JP
Korean	ko_KR
Polish	pl_PL
Brazilian Portugese	pt_BR
Russian	ru_RU
Spanish	es_ES

During installation :
- The Tivoli Storage Manager backup-archive client and Web client files are installed in the `/opt/tivoli/tsm/client/ba/bin` directory.
- The Tivoli Storage Manager administrative client (command line) is installed in the `/opt/tivoli/tsm/client/admin/bin` directory.
- The Tivoli Storage Manager API files are installed in the `/opt/tivoli/tsm/client/api/bin` directory.
- The Tivoli Storage Manager documentation files are installed in the `/opt/tivoli/tsm/client/books/html` and `/opt/tivoli/tsm/client/books/pdf` directories.

After installation completes, see Chapter 2, "Configuring Tivoli Storage Manager," on page 33 for required and optional tasks to perform before using Tivoli Storage Manager.

Installing the Linux on Intel Itanium client

Attention: For current installation and configuration information for the Tivoli Storage Manager program product, refer to the README file that is shipped on the product installation media. For current information concerning Tivoli Storage Manager, supported platforms, and documentation, refer to the Web site at:

```
http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html
```

The following installation options are available in uncompressed packages on the CD:

tsmcli/linuxIA64/TIVsm-BA.ia64.rpm
Installs the backup-archive client (command-line and GUI), administrative client (command-line), the Web client, and documentation.

> **Note:** Additional language support is available with component names **TIVsm-BA.msg.***lang***.ia64.rpm**. Replace *lang* with the appropriate language code from Table 9 on page 23.

tsmcli/linuxIA64/TIVsm-API.ia64.rpm
Installs the Application Programming Interface (API) containing the Tivoli Storage Manager API shared libraries and samples.

> **Note:** Additional language support is available with component names **TIVsm-API.msg.***lang***.ia64.rpm**. Replace *lang* with the appropriate language code from Table 9 on page 23.

To delete previously installed Tivoli Storage Manager client packages, log in as root and enter:

```
   rpm -e TIVsm-BA
and for the API:
   rpm -e TIVsm-API
```

If an additional Language package is installed, you must uninstall it first:

```
rpm -e TIVsm-BA.msg.lang
rpm -e TIVsm-API.msg.lang
```

Replace *lang* with the appropriate language code from Table 9 on page 23.

Note: The package version number is not needed for uninstall.

Use the following procedure to install the Tivoli Storage Manager clients:

1. Log in as the root user and mount the CD-ROM to /cdrom.
2. Enter the following directory path where the installation packages reside on the CD:

   ```
   /cdrom/tsmcli/linuxia64
   ```

3. Enter the following commands to install the backup-archive client (command-line, API, and GUI), the administrative client (command-line), and the Web client:

   ```
   First:
   rpm -i TIVsm-API.ia64.rpm
   Then:
   rpm -i TIVsm-BA.ia64.rpm
   ```

   > **Note:** The backup-archive client requires the API package to perform image backups and for Data Protection product support.

   To circumvent the dependence check, use the --nodeps option. Please be aware to check the dependencies manually:

```
First:
rpm -i --nodeps TIVsm-API.ia64.rpm
Then:
rpm -i --nodeps TIVsm-BA.ia64.rpm
```
4. To install additional language support (the default is American English), enter
   the following commands:
   ```
   rpm -i TIVsm-API.msg.lang.ia64.rpm
   rpm -i TIVsm-BA.msg.lang.ia64.rpm
   ```

   Replace *lang* with the appropriate language code from Table 9.

Table 9. Linux IA64 client: Language codes for installation packages

Language	Language code
Simplified Chinese	zh_CN
Traditional Chinese (Big5)	zh_TW
Czech	cs_CZ
French	fr_FR
German	de_DE
Hungarian	hu_HU
Italian	it_IT
Japanese	ja_JP
Korean	ko_KR
Polish	pl_PL
Brazilian Portugese	pt_BR
Russian	ru_RU
Spanish	es_ES

During installation :
- The Tivoli Storage Manager backup-archive client and Web client files are
  installed in the /opt/tivoli/tsm/client/ba/bin directory.
- The Tivoli Storage Manager administrative client (command line) is installed in
  the /opt/tivoli/tsm/client/admin/bin directory.
- The Tivoli Storage Manager API files are installed in the
  /opt/tivoli/tsm/client/api/bin64 directory.
- The Tivoli Storage Manager documentation files are installed in the
  /opt/tivoli/tsm/client/books/html and /opt/tivoli/tsm/client/books/pdf
  directories.

After installation completes, see Chapter 2, "Configuring Tivoli Storage Manager,"
on page 33 for required and optional tasks to perform before using Tivoli Storage
Manager.

Installing the Linux390 client

Attention: For current installation and configuration information for the Tivoli Storage Manager program product, refer to the README file that is shipped on the product installation media. For current information concerning Tivoli Storage Manager, supported platforms, and documentation, refer to the Web site at:

`http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html`

The following installation options are available in uncompressed packages on the CD:

`tsmcli/linux390/TIVsm-BA.s390.rpm`
>   Installs the backup-archive client (command-line and GUI), administrative client (command-line), and the Web client.

>   **Note:** Additional language support is available with component names **TIVsm-BA.msg.***lang***.s390.rpm**. Replace *lang* with the appropriate language code from Table 10 on page 25.

`tsmcli/linux390/TIVsm-API.s390.rpm`
>   Installs the Application Programming Interface (API) containing the Tivoli Storage Manager API shared libraries and samples.

>   **Note:** Additional language support is available with component names **TIVsm-API.msg.***lang***.s390.rpm**. Replace *lang* with the appropriate language code from Table 10 on page 25.

To delete previously installed client packages, log in as root and enter:

```
   rpm -e TIVsm-BA
and for the API:
   rpm -e TIVsm-API
```

If an additional Language package is installed, you must uninstall it first:

```
rpm -e TIVsm-BA.msg.lang
rpm -e TIVsm-API.msg.lang
```

Note: The package version number is not needed for uninstall.

Use this installation procedure to install directly from the CD-ROM from a local or remote-mounted CD-ROM drive:

1. Log in as the root user and mount the CD-ROM to `/cdrom`.

2. Enter the following directory path where the installation packages reside on the CD:

   `/cdrom/tsmcli/linux390`

3. Enter the following command to install the backup-archive client (command-line and GUI), administrative client (command-line) and the Web client:

   ```
   rpm -i TIVsm-BA.s390.rpm
   rpm -i TIVsm-API.s390.rpm
   ```

   Note: If all required *libs* are not installed with rpm please enter the following command:

   ```
   rpm -i --nodeps TIVsm-BA.s390.rpm
   rpm -i --nodeps TIVsm-API.s390.rpm
   ```

4. To install additional language support (the default is American English), enter the following commands:

   ```
   rpm -i TIVsm-API.msg.lang.s390.rpm
   rpm -i TIVsm-BA.msg.lang.s390.rpm
   ```

Replace *lang* with the appropriate language code from Table 10.

Table 10. Linux390 client: Language codes for installation packages

Language	Language code
Simplified Chinese	zh_CN
Traditional Chinese	zh_TW
Czech	cs_CZ
French	fr_FR
German	de_DE
Hungarian	hu_HU
Italian	it_IT
Japanese	ja_JP
Korean	ko_KR
Polish	pl_PL
Brazilian Portugese	pt_BR
Russian	ru_RU
Spanish	es_ES

During installation :
- The Tivoli Storage Manager backup-archive client and Web client files are installed in the `/opt/tivoli/tsm/client/ba/bin` directory.
- The Tivoli Storage Manager administrative client (command line) is installed in the `/opt/tivoli/tsm/client/admin/bin` directory.
- The Tivoli Storage Manager API files are installed in the `/opt/tivoli/tsm/client/api/bin` directory.
- The Tivoli Storage Manager documentation files are installed in the `/opt/tivoli/tsm/client/books/html` and `/opt/tivoli/tsm/client/books/pdf` directories.

After installation completes, see Chapter 2, "Configuring Tivoli Storage Manager," on page 33 for required and optional tasks to perform before using Tivoli Storage Manager.

Installing the Linux pSeries and Linux iSeries clients

Attention: For current installation and configuration information for the Tivoli Storage Manager program product, refer to the README file that is shipped on the product installation media. For current information concerning Tivoli Storage Manager, supported platforms, and documentation, refer to the Web site at:

`http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html`

The following installation options are available in uncompressed packages on the CD:

`tsmcli/linuxppc/TIVsm-BA.ppc64.rpm`
   Installs the backup-archive client (command-line), administrative client (command-line), the Web client, and documentation.

   Note: Additional language support is available with component names **TIVsm-BA.msg.***lang***.ppc64.rpm**. Replace *lang* with the appropriate language code from Table 11 on page 27.

`tsmcli/linuxppc/TIVsm-API.ppc64.rpm`
   Installs the Application Programming Interface (API) containing the Tivoli Storage Manager API shared libraries and samples.

   Note: Additional language support is available with component names **TIVsm-API.msg.***lang***.ppc64.rpm**. Replace *lang* with the appropriate language code from Table 11 on page 27.

To delete previously installed Tivoli Storage Manager client packages, log in as root and enter:

```
   rpm -e TIVsm-BA
and for the API:
   rpm -e TIVsm-API
```

If an additional Language package is installed, you must uninstall it first:

```
rpm -e TIVsm-BA-.msg.lang
rpm -e TIVsm-API.msg.lang
```

Replace *lang* with the appropriate language code from Table 11 on page 27.

Note: The package version number is not needed for uninstall.

Use the following procedure to install the Tivoli Storage Manager clients:

1. Log in as the root user and mount the CD-ROM to `/cdrom`.
2. Enter the following directory path where the installation packages reside on the CD:

   `/cdrom/tsmcli/linuxppc`

3. Enter the following commands to install the backup-archive client (command-line and API), the administrative client (command-line), and the Web client:

   ```
   First:
   rpm -i TIVsm-API.ppc64.rpm
   Then:
   rpm -i TIVsm-BA.ppc64.rpm
   ```

   To circumvent the dependence check use the --nodeps option. Please be aware to check the dependencies manually:

```
First:
rpm -i --nodeps TIVsm-API.ppc64.rpm
Then:
rpm -i --nodeps TIVsm-BA.ppc64.rpm
```

> **Note:** The backup-archive client requires the API package to perform image backups.

4. To install additional language support (the default is American English), enter the following commands:

```
rpm -i TIVsm-API.msg.lang.ppc64.rpm
rpm -i TIVsm-BA.msg.lang.ppc64.rpm
```

Replace *lang* with the appropriate language code from Table 11.

Table 11. Linux pSeries and Linux iSeries clients: Language codes for installation packages

Language	Language code
Simplified Chinese	zh_CN
Traditional Chinese	zh_TW
Czech	cs_CZ
French	fr_FR
German	de_DE
Hungarian	hu_HU
Italian	it_IT
Japanese	ja_JP
Korean	ko_KR
Polish	pl_PL
Brazilian Portugese	pt_BR
Russian	ru_RU
Spanish	es_ES

During installation :
- The Tivoli Storage Manager backup-archive client and Web client files are installed in the /opt/tivoli/tsm/client/ba/bin directory.
- The Tivoli Storage Manager administrative client (command line) is installed in the /opt/tivoli/tsm/client/admin/bin directory.
- The Tivoli Storage Manager API files are installed in the /opt/tivoli/tsm/client/api/bin directory.
- The Tivoli Storage Manager documentation files are installed in the /opt/tivoli/tsm/client/books/html and /opt/tivoli/tsm/client/books/pdf directories.

After installation completes, see Chapter 2, "Configuring Tivoli Storage Manager," on page 33 for required and optional tasks to perform before using Tivoli Storage Manager.

Installing the Solaris clients

Attention: For current installation and configuration information for the Tivoli Storage Manager program product, refer to the README file that is shipped on the product installation media. For current information concerning Tivoli Storage Manager, supported platforms, and documentation, refer to the Web site at:

`http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html`

The following installation packages are available on the CD in the /cdrom/tsmcli/solaris directory:

Backup-Archive Packages:

TIVsmCba.pkg
> Contains the Tivoli Storage Manager backup-archive client (command-line and GUI), the administrative client (command-line), and the Web backup-archive client.
>
> **Note:** Additional language support is available with component names **TIVsmCb**_lang_**.pkg**. Replace _lang_ with the appropriate language code from Table 12 on page 29.

API Packages:

TIVsmCapi.pkg
> Contains the Tivoli Storage Manager Application Programming Interface (API), the Tivoli Storage Manager API shared libraries (32 and 64 Bit mode) and samples.
>
> **Note:** Additional language support is available with component names **TIVsmCa**_lang_**.pkg**. Replace _lang_ with the appropriate language code from Table 12 on page 29.

HSM Package:

TIVsmChsm.pkg
> Contains Tivoli Storage Manager Hierarchical Storage Management (HSM).

Documentation Package:

TIVsmCdoc.pkg
> Contains Tivoli Storage Manager documentation in html and pdf format.

Use the following procedure to install the Tivoli Storage Manager clients:

1. Remove previous versions of ADSM or Tivoli Storage Manager:
   - To remove previous Tivoli Storage Manager versions, as root enter:
     ```
     pkgrm TIVsmCba TIVsmCapi TIVsmCdoc
     ```
   - To remove previous ADSM versions, as root enter:
     ```
     pkgrm IBMadsm-w IBMadsm-c IBMadsm-a IBMadsm-h
     ```

     Note: Ensure that you uninstall these packages in the given order.
   - To remove previous HSM versions, as root enter:
     ```
     pkgrm TIVsmChsm
     ```

     Note: For further information, refer to the README file that is shipped on the product installation media.
2. Change to the directory where the packages are stored:

```
cd /cdrom/tsmcli/solaris
```

> **Note:** If the Tivoli Storage Manager UNIX client CD-ROM is not mounted to
> /cdrom or if the packages are stored in a different directory (e.g.
> downloaded by ftp), please change to the correct directory.

3. As root user, enter the following commands and include the package name. For
   example, to install the backup-archive client (english version), enter:
   ```
   pkgadd -d ./TIVsmCapi.pkg TIVsmCapi
   pkgadd -d ./TIVsmCba.pkg  TIVsmCba
   ```

   To install additional language support, enter the following commands:
   ```
   pkgadd -d ./TIVsmCalang.pkg TIVsmCalang
   pkgadd -d ./TIVsmCblang.pkg TIVsmCalang
   ```

   Replace *lang* with the appropriate language code from Table 12.

4. If you want to install the documentation, enter:
   ```
   pkgadd -d ./TIVsmCdoc.pkg TIVsmCdoc
   ```

5. Answer *Yes* (y) to all questions about setuid, setgid, superuser permissions
   during installation. If you do not want be prompted for these questions during
   installation, use the -a option of the pkgadd command and the tsmadmin file.
   For example, to install the backup-archive client (english version), enter the
   following commands:
   ```
   pkgadd -a ./tsmadmin -d ./TIVsmCapi.pkg TIVsmCapi
   pkgadd -a ./tsmadmin -d ./TIVsmCba.pkg  TIVsmCba
   ```

   To install additional language support, enter the following commands:
   ```
   pkgadd -d ./tsmadmin -d ./TIVsmCalang.pkg TIVsmCalang
   pkgadd -d ./tsmadmin -d ./TIVsmCblang.pkg TIVsmCalang
   ```

   Replace *lang* with the appropriate language code from Table 12.

> **Note:** To display the Tivoli Storage Manager help browser menus in your locale
> language, ensure the NLSPATH environment variable in the /etc/profile file
> contains the following path:
>
> ```
> /usr/dt/lib/nls/msg/%L/%N.cat
> ```

Table 12. Solaris client: Language codes for installation packages

Language	Language code
Simplified Chinese	Sc
Traditional Chinese (EUC)	Tc
Traditional Chinese (BIG5)	Bc
Czech	Cs
French	Fr
German	De
Hungarian	Hu
Italian	It
Japanese	Ja
Korean	Ko
Polish	Pl
Brazilian Portugese	Pt

Table 12. Solaris client: Language codes for installation packages (continued)

Language	Language code
Russian	Ru
Spanish	Es

During installation :
- The Tivoli Storage Manager backup-archive and Web client files are installed in the `/opt/tivoli/tsm/client/ba/bin` directory.
- The Tivoli Storage Manager administrative client (command line) is installed in the `/opt/tivoli/tsm/client/admin/bin` directory.
- The Tivoli Storage Manager API files are installed in the `/opt/tivoli/tsm/client/api/bin` directory.
- The Tivoli Storage Manager documentation files are installed in the `/opt/tivoli/tsm/client/books` directory.

After installation completes, see Chapter 2, "Configuring Tivoli Storage Manager," on page 33 for required and optional tasks to perform before using Tivoli Storage Manager.

The Tivoli Storage Manager clients work in conjunction with the Tivoli Storage Manager server. Contact your Tivoli Storage Manager server administrator to obtain backup or archive access to the server, or refer to the following publications to install and configure a Tivoli Storage Manager server:

Table 13. Tivoli Storage Manager server Quick Start publications

Publication title	Order number
IBM Tivoli Storage Manager for AIX Quick Start	GC32-0770
IBM Tivoli Storage Manager for HP-UX Quick Start	GC32-0774
IBM Tivoli Storage Manager for Linux Quick Start	GC23-4692
IBM Tivoli Storage Manager for OS/390 and z/OS Quick Start	GC32-0777
IBM Tivoli Storage Manager for OS/400 PASE Quick Start	GC23-4696
IBM Tivoli Storage Manager for Sun Solaris Quick Start	GC32-0780
IBM Tivoli Storage Manager for Windows Quick Start	GC32-0784

Chapter 2. Configuring Tivoli Storage Manager

> **Attention**
>
> For current configuration information for the Tivoli Storage Manager program product, refer to the README file that is shipped on the product installation media.

After successfully installing the Tivoli Storage Manager client, you must configure the client before performing any operations.

Note: If you are upgrading your Tivoli Storage Manager client, it is unnecessary to reconfigure the scheduler, Web client, or other configuration settings. If the dsm.opt and dsm.sys files used by the previous client installation are available in the default installation directory or the directory pointed to by the DSM_CONFIG and DSM_DIR environment variables, Tivoli Storage Manager accesses these files for configuration information.

Required configuration tasks include the following:

Task	Page
Creating and modifying the client system options file (required root user or authorized user task)	35
Registering your workstation with a server (required root user or authorized user task)	48

Optional configuration tasks include the following:

Task	Page
Setting environment variables	39
Creating a default client user options file (optional root user or authorized user task)	36
Creating a customized client user options file (optional user task)	37
Configuring the Web client	43
Configuring the client scheduler	44

Root and authorized user tasks

The phrases **root user** and **Authorized User** identify tasks that only root users and Authorized Users can perform. An **Authorized User** is any user running with a real user ID of **0** (root) or who owns the Tivoli Storage Manager executable with the owner execution permission bit set to **s**.

Table 14 on page 34 shows the tasks that can be performed by the root user, Authorized User, and the non-Authorized User.

Table 14. Root user, Authorized User, and non-Authorized user tasks

Task	Root User	Authorized User	Non-Authorized User
Install the backup-archive client.	Root users can install the backup-archive client.	Authorized Users cannot install the backup-archive client.	Non-Authorized Users cannot install the backup-archive client.
Registering new nodes with Tivoli Storage Manager server.	Root users can register new nodes on the Tivoli Storage Manager server.	Authorized Users can register new nodes on the Tivoli Storage Manager server.	Non-Authorized Users *cannot* register a new node, even when the registration set to *open* on the server.
Set or change the Tivoli Storage Manager password for client workstations.	Root users can set or recreate the password file if it is deleted.	Authorized Users can set or recreate the password file if it is deleted, if they have write permission to the file.	Non-Authorized Users *cannot* set or recreate the password file if it is deleted.
Create and modify the client system options file (dsm.sys).	Root users can create and modify the dsm.sys file.	Authorized Users can create and modify the dsm.sys file if they have write permission to the file.	Non-Authorized Users *do not* have access to create or modify the dsm.sys file.
Create and modify the client user options file (dsm.opt).	Root users can create and modify the dsm.opt file.	Authorized Users can create and modify a default dsm.opt file if they have write permission to the file.	Non-Authorized Users can create and modify a dsm.opt file that they own.
Create and modify an include-exclude list.	Root users can create and modify an include-exclude list.	Authorized Users can create and modify an include-exclude list.	Non-Authorized Users *cannot* create and modify an include-exclude list.
Backup	Root users can back up any file.	Authorized Users can back up files for which they have read permission, regardless of ownership.	Non-Authorized Users can back up only files that they own.
Restore	Root users can restore any file. When restoring to a new location or same location, files permission and ownership are preserved.	Authorized Users can restore any files (even files backed up by other users). However, only the operating system will prevent writing to the same location if the file has only read permission. Ownership of all restored objects will be changed to Authorized User.	Non-Authorized Users can restore files that they own or files to which they are granted access. The ownership of the restored file will change to the non-Authorized user.
Archive	Root users can archive any file.	Authorized Users can archive files they have read access to, regardless of ownership.	Non-Authorized Users can archive files they have read access to, regardless of ownership.
Retrieve	Root users can retrieve any file. When retrieving to a new location or the same location, file permissions and ownership are preserved.	Authorized Users can retrieve any files (even files archived by other users). However, only the operating system will prevent writing to the same location if the file has only read permission. Ownership of all retrieved objects will be changed to Authorized User.	Non-Authorized Users can retrieve any file they archived regardless of the ownership or files to which they are granted access. Ownership of all retrieved objects will be changed to the non-Authorized user.

Task	Root User	Authorized User	Non-Authorized User
Client scheduler	Root users can use the client scheduler to perform scheduled task for a client node.	Authorized Users can use the client scheduler to perform scheduled task for a client node.	Non-Authorized Users *cannot* use the client scheduler to perform scheduled task for a client node.
Grant user access to files on the Tivoli Storage Manager server.	Root users can grant user access to files owned by any user on the Tivoli Storage Manager server.	Authorized Users can grant user access to files owned by any user on the Tivoli Storage Manager server.	Non-Authorized Users can grant user access only to files they own on the Tivoli Storage Manager server.
Delete Tivoli Storage Manager server file spaces.	Root users can delete Tivoli Storage Manager server file spaces if they are granted backup or archive delete authority by a Tivoli Storage Manager server administrator.	Authorized Users can delete Tivoli Storage Manager server file spaces if they are granted backup or archive delete authority by a Tivoli Storage Manager server administrator.	Non-Authorized Users *cannot* delete Tivoli Storage Manager server file spaces.

Creating and modifying the client system options file (required root user or authorized user task)

During installation, the sample client system options file dsm.sys.smp is placed in the installation directory.

If you are a **root user** or authorized user, copy the dsm.sys.smp file to dsm.sys. You *must* name the client system options file (dsm.sys). It is assumed that the dsm.sys file is controlled by the system administrator.

Attention: If you are reinstalling and you want to keep your existing dsm.sys file intact, do not copy the dsm.sys.smp file to dsm.sys.

Use the client system options file (dsm.sys) to specify one or more servers to contact for services, and communications options for each server. This file can also include authorization options, backup and archive processing options, and scheduling options.

Edit dsm.sys to include the server or servers to which you want to connect. The following is an example of a client system options file stanza which contains the required options for a server you want users to contact. You can specify options for more than one server:

```
Servername              server_a
COMMmethod              TCPip
TCPPort                 1500
TCPServeraddress        node.domain.company.com
```

Note: If you want to use the Web client, you must also specify the *passwordaccess*=*generate* option. See "Passwordaccess" on page 264 for more information.

As the default, your client node contacts the first server identified in the client system options file (dsm.sys). You can specify a different server to contact by entering the *servername* option in your own client user options file (dsm.opt), or by entering that option with a command.

You can also specify a default server and a migration server (if you have the HSM client installed on your workstation) in your client system options file (dsm.sys). For more information, see "Defaultserver" on page 187.

The dsm.sys file can also contain the following option categories:
• Communication options
• Backup and archive processing options
• Restore and retrieve processing options
• Scheduling options
• Authorization options
• Error processing options
• Transaction processing option
• Web client options

Note: See Chapter 9, "Using processing options," on page 145 for more information about these options.

You can modify your client system options file (dsm.sys) using one of the following methods:
• From the client GUI main window, select **Edit** → **Preferences**.
• Use your favorite text editor.

If you update the dsm.sys file during a session, you must restart the session to pick up the changes.

See "Setting options in an options file" on page 38 for information on how to set options in the dsm.sys file.

Creating a default client user options file (optional root user or authorized user task)

During installation, a sample client user options file called dsm.opt.smp is placed in the installation directory.

Copy the dsm.opt.smp file to dsm.opt in your installation directory and modify the required options according to your needs.

This file contains the following options:
• Communication options
• Backup and archive processing options
• Restore and retrieve processing options
• Scheduling options
• Format options
• Command processing options
• Authorization options
• Error processing options
• Transaction processing option
• Web client options

See Chapter 9, "Using processing options," on page 145 for more information about these options.

If you are a root user, you can create or modify a default client user options file for all users on your workstation. From the UNIX command line:
- Change to the directory containing the sample file.
- Copy the dsm.opt.smp file to dsm.opt or to a new file name of your choice.

  Attention: If you are reinstalling and you want to keep your existing dsm.opt file intact, do not copy the dsm.opt.smp file to dsm.opt.
    – **For the default client user options file**: You can store your default client user options file in the same directory as the dsm.sys.smp file, or in any directory for which you have write access. If you rename your client user options file or place it in a different directory, you must set the DSM_CONFIG environment variable to point to your new client user options file.
    – **For the client user options file**: You can rename your client user options file and store it in any directory to which you have write access. Set the DSM_CONFIG environment variable to point to your new client user options file.

  We recommend that you use full path names instead of relative path names when you set environment variables.

  For the Bourne or Korn shell, enter the DSM_CONFIG variable in the .profile file in your $HOME directory. For example:

  ```
  DSM_CONFIG=/home/monnett/dsm.opt
  export DSM_CONFIG
  ```

  For the C shell, add the DSM_CONFIG variable to the `.cshrc` file in your $HOME directory. For example:

  ```
  setenv DSM_CONFIG /home/monnett/dsm.opt
  ```

You can then edit your dsm.opt file as appropriate for your system. From the GUI, you can edit this file using the Preferences editor by opening the **Edit** menu and selecting **Preferences**. The Preferences editor updates the client configuration files, dsm.opt and dsm.sys, if any options have changed. If you update the dsm.opt file during a session, you must restart the session to pick up the changes.

The Preferences editor uses the environment variable DSM_DIR to locate the client system options file (`dsm.sys`) and DSM_CONFIG to locate the client user options file (default name `dsm.opt`). The Preferences editor queries the server for options on the server, but only updates the client options file.

See "Setting options in an options file" on page 38 for more information about setting options in a file.

Creating a customized client user options file (optional user task)
If you are a user and want to use different options than those specified in the default client user options file (dsm.opt), you can create your own client user options file. You can set all the options that can be set in the default user options file.

For example, in the client user options file, you can use the ***domain*** option to specify the file systems you want to incrementally back up. The default is all locally mounted file systems except for /tmp.

To create or modify a client user options file, use the following method:
1. Contact the root user on your workstation to determine the location of the sample client user options file dsm.opt.smp.

2. Copy dsm.opt.smp to your home directory as dsm.opt, or a new file name of your choice. You can store your client user options file in any directory to which you have write access.
3. Set the DSM_CONFIG environment variable to point to your new client user options file. For instructions to set this variable, see section, "Setting environment variables" on page 39.
4. Edit your dsm.opt file as appropriate for your system or use the Tivoli Storage Manager Preferences editor by selecting **Edit → Preferences** from the Tivoli Storage Manager GUI.

See "Setting options in an options file" for more information about setting options in a file.

Setting options in an options file

This section describes how to set options in your client system options file (dsm.sys) or client user options file (dsm.opt), and how to use options with commands.

To view or modify an options file, click **Edit → Preferences** from the Tivoli Storage Manager client GUI. The Preferences editor updates the client system options file or client user options file.

You can also edit an options file with your favorite text editor.

To set an option in these files, enter the option name and one or more blank spaces, followed by the option value. For example:

```
compression  yes
nodename     client_a
```

Some options consist of only the option name, such as *verbose* and *quiet*. You can enter the entire option name or its abbreviation. For example, you can specify the *verbose* option as either of the following:

```
verbose
ve
```

Follow these additional rules when entering options in your client user options file (dsm.opt):

- Begin each comment with an asterisk (*) as the first character in a line.
- Do not enter comments on the same line as an option.
- Indent options with spaces or tabs.
- Enter each option on a separate line and enter all parameters for an option on the same line. For example, to specify a group of five different file systems as your default client domain, enter:

```
domain /home /mfg /planning /mrkting /mgmt
```

- Enter one or more blank spaces between parameters.
- The maximum number of characters for a file name is 256. The maximum combined length of the file name and path name is 1024 characters.

If you update the client user options file while a session is active, you must restart the session to pick up the changes.

You can use the **query options** command to display all or part of your options and their current settings. This command accepts an argument to specify a subset of options. The default is to display all options. See "Query Options" on page 399 for more information.

Setting environment variables

Setting language environment variables

The Tivoli Storage Manager client automatically detects the language of the system locale and displays Tivoli Storage Manager for that language. For example, a French operating system displays Tivoli Storage Manager in French by default. If Tivoli Storage Manager cannot load the French message catalog, it will default to the English (United States) language pack. For example, if the client is running on an unsupported language/locale combination, such as French/Canada or Spanish/Mexico, Tivoli Storage Manager defaults to English (United States).

You can use the **LANG** environment variable to specify the language for the AIX, HP-UX, Linux, and Solaris clients. For all other UNIX clients, only English (United States) is available.

Tivoli Storage Manager supports the following language locales:

Table 15. Supported language locales

Languages	AIX	HP-UX	Solaris	All Linux clients
English (United States)	en_US	en_US	en_US, en_US.ISO8859-1	en_US
Simplified Chinese	zh_CN	zh_CN	zh	zh_CN,
Traditional Chinese	zh_TW, Zh_TW.BIG5	zh_TW.eucTW	zh_TW.EUC, Zh_TW.big5	zh_TW.big5
Czech	cs_CZ	cs_CZ	cs	cs_CZ
French (Standard)	fr_FR	fr_FR	fr	fr_FR
German (Standard)	de_DE	de_DE	de	de_DE
Hungarian	hu_HU	hu_HU	hu	hu_HU
Italian (Standard)	it_IT	it_IT	it	it_IT
Japanese	ja_JP, Ja_JP	ja_JP.eucJP	ja, ja_JP.eucJP	ja_JP.eucJP
Korean	ko_KR	ko_KR	ko	ko_KR
Polish	pl_PL	pl_PL	pl	pl_PL
Portuguese (Brazil)	pt_BR	pt_BR	pt	pt_BR
Russian	ru_RU	ru_RU	ru	ru_RU
Spanish	es_ES	es_ES	es	es_ES

Note:

- Traditional Chinese BIG5 has locale zh_TW on Linux, while zh_TW is used on other platforms for eucTW.
- Only the command line interface is supported for Linux pSeries and Linux iSeries.
- Not all UNIX shells are able to show multi-byte characters.

- For Motif: Make sure that your command line shell is capable of showing the selected locale. The native GUI has to be started from a Window Manager, such as CDE, KDE2, Gnome, or Exceed that supports the selected locale.

To set the **LANG** environment variable to French, type the following:

```
export LANG=fr_FR
```

On the Solaris platform, you also need to export the LC_ALL environment variable.

Notes:

1. To display the Tivoli Storage Manager help browser menus in the language of your current locale, insure that the NLSPATH environment variable in the /etc/profile file contains the following path:

   ```
   NLSPATH=/usr/dt/lib/nls/msg/%L/%N.cat:$NLSPATH
   export NLSPATH
   ```

2. For double-byte languages (Chinese/Korean/Japanese) on UNIX, we recommend that you change the language via the **Options** button on the CDE login screen, rather than exporting LANG environment variable via the command line.

If the **LANG** environment variable is set to **C**, POSIX (limiting the valid characters to those with ASCII codes less than 128), or other values with limitations for valid characters, the backup-archive client skips files which have file names containing invalid characters with ASCII codes higher than 127.

If you are using a single-byte character set (SBCS) like English as your language environment, all file names are valid and backed up by the backup-archive client. Multi-byte characters are interpreted as a set of single bytes all containing valid characters. If you are using multi-byte character sets (MBCS) as your language environment, the backup-archive client backs up file names that consist of valid characters in the current environment.

For example, a file name consisting of Japanese characters may contain invalid multi-byte characters if the current language environment is a Chinese character set. Files containing invalid multi-byte characters are not backed up and are not shown by the graphical user interface. If such files are found during backup, the dsmerror.log file will list the skipped files.

When using the backup-archive client scheduling mode to back up a whole system, it is strongly recommended to set the **LANG** environment variable to **en_US** (or some other SBCS language) to avoid skipped files.

Setting font defaults

Running the backup-archive GUI outside the CDE desktop could result in errors due to unresolved **fonts**. Ensure that all required fonts are available for your language environment when running the backup-archive GUI outside the CDE desktop.

Note: The command **xrdb** **-m .Xdefaults** must be issued to update the X System on demand.

When running the backup-archive GUI under Motif, and outside the CDE desktop, add the following entry to the .Xdefaults file in your home directory:

```
dsm*fontList: -dt-interface system-medium-r-normal-xs*-*-*-*-*-*-*-*-*:
```

For Linux X86, add the following entries to the .Xdefaults file in your home
directory. Remove the ! (exclamation point) in front of the **dsm*fontList** entry to
activate the appropriate locale.

```
!
! ja_JP locale
!
!dsm*fontList:  -adobe-helvetica-medium-r-*--14-*-*-*-*-*-*-*;\
!               -misc-*-medium-r-*--14-*-*-*-*-*-*-*:

!
! zh_CN locale
!
!dsm*fontList:  -*-helvetica-medium-r-normal-*-*-120-*-*-*-*-iso8859-*;\
!               -isas-fangsong ti-medium-r-normal--16-160-72-72-c-160-gb2312.1980-0:

!
! zh_TW locale
!
!dsm*fontList:  -*-helvetica-medium-r-normal-*-*-140-*-*-*-*-iso8859-*;\
!               -default-ming-medium-r-normal--16-*-*-*-c-160-big5-0:

!
! ko_KR
!
!dsm*fontList:  -*-helvetica-medium-r-*-*-*-120-*-*-*-*-iso8859-*;\
!               -daewoo-mincho-medium-r-normal--16-120-100-100-c-160\
!               -ksc5601.1987-*;*-r-*:

!
! ru_RU
!
!dsm*fontList: \
! -sony_windows_1251-fixed-medium-r-normal--16-120-100-100-c-80-\
! microsoft-cp1251
!
! European (de_DE, fr_FR, etc.)
!
!dsm*fontList: -*-helvetica-medium-r-normal-*-*-120-*-*-*-*-iso8859-*
```

Setting processing environment variables

Generally, setting the environment variables is an optional task. Setting them will
make it more convenient for you to use the command line. However, you must set
the environment variables if you need to run in either of the following
environments:

1. You want to invoke Tivoli Storage Manager from a directory other than the
   directory where Tivoli Storage Manager is installed.
2. You want to specify a different options file for the backup-archive client, the
   administrative client, or both.

Note: You can also specify an alternate client options file for the command line
client (not the administrative client) using the *optfile* option. See "Optfile"
on page 262 for more information.

There are three environment variables you can set which affect Tivoli Storage
Manager processing:

DSM_DIR
> Points to the executable file dsmc, the resource files, and the dsm.sys file.
> You cannot specify the root directory for DSM_DIR. If DSM_DIR is not set,
> the executables are expected in the default installation directory.

When you request an image or a NAS backup or restore, Tivoli Storage Manager uses the DSM_DIR environment variable to locate the corresponding plug-in library. If DSM_DIR is not set, the client will look for the plug-in library in the following directories:

AIX   /usr/tivoli/tsm/client/ba/bin/plugins

HP-UX, all Linux clients, and Solaris
>   /opt/tivoli/tsm/client/ba/bin/plugins

DSM_CONFIG
> Contains the fully-qualified path and file name of the client user options file for users who create their own personalized options file.
>
> If DSM_CONFIG is *not* set, the client user options file is expected to satisfy both of these requirements:
> 1. The options file should be named dsm.opt
> 2. The options file should reside in the directory pointed to by DSM_DIR
>
> However, if DSM_DIR is *not* set, then dsm.opt is expected in the default installation directory.

DSM_LOG
> Points to the directory where you want the dsmerror.log, dsmwebcl.log, and dsmsched.log files to reside. The error log file contains information about any errors that occur during processing. The client creates the error log to help the Tivoli Storage Manager technical support team diagnose severe errors.
>
> If you define DSM_LOG, Tivoli Storage Manager writes messages to the dsmerror.log, dsmwebcl.log, and dsmsched.log files in the directory you specify.
>
> If you define DSM_DIR, but not DSM_LOG, Tivoli Storage Manager writes messages to the dsmerror.log, dsmwebcl.log, and dsmsched.log files in the directory specified by DSM_DIR.
>
> If you do not define DSM_LOG or DSM_DIR, Tivoli Storage Manager writes messages to the dsmerror.log, dsmwebcl.log, and dsmsched.log files in the current directory.
>
> **Notes:**
> 1. If you use the *errorlogname* option to specify the fully qualified path where you want to store the dsmerror.log file, this value overrides the definitions in the DSM_LOG or DSM_DIR environment variables. The dsmwebcl.log and dsmsched.log files will be created in the same directory as the dsmerror.log file.
> 2. The dsmerror.log file cannot be a symbolic link. If there is a preexisting dsmerror.log symbolic link, Tivoli Storage Manager will delete the link and exit the operation. This prevents Tivoli Storage Manager from overwriting protected data. The dsmerror.log file is created in a subsequent operation. This behavior also applies to the dsmsched.log file.
> 3. You cannot specify the root directory for DSM_LOG.
> 4. When Tivoli Storage Manager cannot write to the log file, it issues a warning message.

Setting Bourne and Korn shell variables

For the Bourne or Korn shell, enter the environment variables in the .profile file in your $HOME directory. For example:

```
DSM_DIR=/home/davehil
DSM_CONFIG=/home/davehil/dsm.opt
DSM_LOG=/home/davehil
export DSM_DIR DSM_CONFIG DSM_LOG
```

where /home/davehil/dsm.opt is the path and file name for your client user options file, and the /home/davehil directory is where you want to store the dsmerror.log file, executable file, resource files, and dsm.sys file.

Setting C shell variables

For the C shell, add the DSM_CONFIG, DSM_LOG and DSM_DIR variables to the .cshrc file in your $HOME directory. For example:

```
setenv DSM_DIR /home/davehil
setenv DSM_CONFIG /home/davehil/dsm.opt
setenv DSM_LOG /home/davehil
```

where /home/davehil/dsm.opt is the path and file name for your client user options file, and the /home/davehil directory is where you want to store the dsmerror.log file, executable file, resource files, and dsm.sys file.

Setting API environment variables

If you installed the Tivoli Storage Manager client API, set the following environment variables:

DSMI_DIR
> Points to your installation directory. The files dsmtca, dsm.sys, and the language files must reside in the directory pointed to by DSMI_DIR. This environment variable must be present.

DSMI_CONFIG
> Full path name of your own client user options file (dsm.opt).

DSMI_LOG
> Path for dsmerror.log. (cannot be a symbolic link)

Note: End users of applications developed with the API should consult the installation directions for that application for special path names or guidelines for options. Ensure that directories in the environment variables are specified in the path statement. The location of the API library is especially important.

For more information about the Tivoli Storage Manager client API, see *IBM Tivoli Storage Manager Using the Application Programming Interface*, GC32-0793.

Configuring the Web client

You can use the command line to configure the Web client.

To configure the Web client from the command line, perform the following steps:

1. Ensure that you specify ***passwordaccess*** *generate* in the client system options file (dsm.sys). For more information on ***passwordaccess***, see "Passwordaccess" on page 264.

2. To generate the Tivoli Storage Manager password, start the backup-archive client by entering:

   ```
   dsmc query session
   ```

   when prompted, enter your user ID and password.

3. Start the client acceptor daemon (CAD) by entering:

   ```
   dsmcad
   ```

   The Tivoli Storage Manager Remote Client Agent daemon must not be started manually. It is automatically started by the Tivoli Storage Manager Client Acceptor daemon when needed.

   The only options applicable to the **dsmcad** program are *optfile*, *httpport*, *managedservices*, and *webports*. You can use the *managedservices* option to specify whether the Tivoli Storage Manager Client Acceptor daemon (CAD) also manages the Tivoli Storage Manager scheduler. See Chapter 9, "Using processing options," on page 145 for more information about these options.

   All Web client messages are written to the Web client log file, dsmwebcl.log. Error messages are written to the error log file dsmerror.log, or the file you specify with the *errorlogname* option. The dsmwebcl.log and dsmerror.log files reside in the directory you specify with the DSM_LOG environment variable or in the current working directory.

4. To access the Web client, enter the following URL from any supported browser:

   ```
   http://your_machine_name:1581
   ```

   where *your_machine_name* is the host name of the machine running the Web client.

Port 1581 is the default port number. You can set a different port number using the *httpport* option. See "Httpport" on page 224 for more information.

After installing and configuring the Web client on your workstation you can use the Web client to perform backup, archive, restore, and retrieve operations from any browser with JRE (Java Runtime Environment) 1.3.1 or higher. See "Starting a Web client session" on page 63 for more information.

Configuring the client scheduler

Your Tivoli Storage Manager administrator can schedule Tivoli Storage Manager to perform tasks automatically. For example, you can automatically back up files at the end of each day or archive some of your files every Friday. This procedure, known as *central scheduling*, is a cooperative effort between the server and your client node. Your administrator associates clients with one or more schedules that are part of the policy domain maintained in the server database. The Tivoli Storage Manager administrator defines central scheduling on the server and you start the client scheduler on your workstation. Once you start the client scheduler, further intervention is not necessary.

With client scheduling, you can also:
* Display information about available schedules.
* Display information about work that the schedule has completed.
* Modify scheduling options in the client system options file (dsm.sys). See "Scheduling options" on page 157 for more information.

See Chapter 7, "Automating tasks," on page 129 for more information. See Appendix A, "Using the Tivoli Storage Manager central scheduler," on page 435 for supplemental information about the Tivoli Storage Manager central scheduler.

The Tivoli Storage Manager Client Acceptor daemon (CAD) can manage the scheduler. In this case, the CAD serves as an external timer for the scheduler. When the scheduler is started, it queries the server for the next scheduled event. The event is either executed immediately or the scheduler exits. The CAD restarts the scheduler when it is time to execute the scheduled event. This reduces the number of background processes on your workstation and resolves memory retention problems that can occur when running the scheduler service without CAD management. It is recommended that you use the Client Acceptor daemon to manage the client scheduler.

Use the *managedservices* option in your client system options file (dsm.sys) to specify whether the CAD manages the scheduler. See "Managedservices" on page 247 for more information.

Perform the following steps to configure the CAD to manage the client scheduler:
1. Install the Web client. See "Configuring the Web client" on page 43 for more information.
2. Install the Scheduler. See "Starting the client scheduler" on page 129 for more information.
3. From the Tivoli Storage Manager GUI, select **Edit** → **Preferences**. Then select the **Web Client** category. Check the **Schedule** option in the **ManagedServices** options section. If you wish to run the Web client also, check the **Both** option.
4. Start the Client Acceptor. See "Configuring the Web client" on page 43 for more information.

Notes:
1. For more information about scheduling options, changing the scheduling mode, specifying the TCP/IP address or port number, or running commands before or after a schedule, see "Scheduling options" on page 157.
2. See Chapter 7, "Automating tasks," on page 129 for information about the following tasks:
   - Starting the client scheduler
   - Modifying scheduling options in the client options file.
   - Displaying information about available schedules.
   - Displaying information about work that the schedule has completed.

To start the client scheduler on your client node and connect to the server schedule, change to the Tivoli Storage Manager installation directory and enter the following command:
```
dsmc schedule
```

Configuring Tivoli Storage Manager client/server communication across a firewall

In most cases, the Tivoli Storage Manager server and clients can work across a firewall. Because every firewall is different, the firewall administrator may need to consult the instructions for the firewall software or hardware in use.

There are two methods for enabling client and server operations through a firewall:

Method 1:

To allow clients to communicate with a server across a firewall, the following ports must be opened in the firewall by the firewall administrator:

TCP/IP port

To enable the backup-archive client, command line admin client, and the scheduler to run outside a firewall, the port specified by the server option *tcpport* (default 1500) must be opened by the firewall administrator. This port is set on the client and the server using the *tcpport* option. The setting must be the same on the client and server. The default TCP/IP port is 1500. See "Tcpport" on page 316 for more information. This will allow Tivoli Storage Manager scheduler communications in both *polling* and *prompted* mode, CAD-managed schedulers, and regular backup-archive client operations.

Note: The client may not use the port specified by the *tcpadminport* option (on the server) for client session. That port may be used for administrative sessions only.

HTTP port

To allow the Web client to communicate with remote workstations across a firewall, the HTTP port for the remote workstation must be opened. Use the *httpport* option in the remote workstation client options file to specify this port. The default HTTP port is 1581.

To use the administrative Web interface for a server across a firewall, the Tivoli Storage Manager administrator must open the HTTP port for the server using the *httpport* option in the server options file. The default HTTP port is 1580.

TCP/IP ports for the remote workstation

The two TCP/IP ports for the remote workstation client must be opened. Use the *webports* option in the remote workstation client options file to specify these ports. If you do not specify the values for the *webports* option, the default zero (0) causes TCP/IP to randomly assign two free port numbers. See "Webports" on page 342 for more information about the *webports* option.

TCP/IP port for administrative sessions

Specifies a separate TCP/IP port number on which the server is waiting for requests for administrative client sessions, allowing secure administrative sessions within a private network. See "Tcpadminport" on page 311 for more information.

Method 2:

For the client scheduler in prompted mode, it is unnecessary to open *any* ports on the firewall. If you set the *sessioninitiation* option to *serveronly*, the client will not attempt to contact the server. *All sessions will be initiated by server prompted scheduling* on the port defined on the client with the *tcpclientport* option. The *sessioninitiation* option only affects the behavior of the client scheduler running in the prompted mode.

The Tivoli Storage Manager server must set the SESSIONINITiation parameter on the REGISTER NODE and UPDATE NODE commands for each node. If the server specifies SESSIONINITiation=*clientorserver*, the default, the client can decide which method to use. If the server specifies SESSIONINITiation=*serveronly*, all sessions are initiated by the server.

Notes:

1. Using the *sessioninitiation* option requires a Tivoli Storage Manager version 5.2 or higher server and client.

2. If you set the *sessioninitiation* option to *serveronly*, with the exception of CAD-managed schedulers, the command line client, native GUI, and Web client GUI ignore the will still attempt to initiate sessions, but are blocked by the Tivoli Storage Manager server for nodes which have the *sessioninitiation* option set to *serveronly*.

3. When configuring the Tivoli Storage Manager scheduler on a client machine for the first time, the scheduler service may be unable to authenticate to the server when the server contacts client scheduler to execute a schedule. This can happen when the *passwordaccess* is set to generate and the Tivoli Storage Manager server is behind a firewall and the encrypted password cannot be locally stored before the scheduler is started. To correct this problem, you need to run scheduler from the command line (dsmc schedule), wait until a scheduled operation starts, and enter the password for your node when prompted.

   A similar problem can occur if an encryption key is required for backup operations. In this case, you can execute the scheduler from the command line (dsmc schedule), wait until a scheduled backup starts, and enter the encryption key when prompted. After the password and encryption key are updated, you must restart the scheduler.

If you set the *sessioninitiation* option to *client*, the client will initiate sessions with the server (Method 1) by communicating on the TCP/IP port defined with the *server* option *tcpport*. This is the default. Server prompted scheduling may be used to prompt the client to connect to the server.

See "Sessioninitiation" on page 299 for more information about the *sessioninitiation* option.

When using Tivoli Storage Manager across a firewall, please consider the following:

- In *prompted* mode the Tivoli Storage Manager server needs to contact the client. In order to do this, some software may need to be installed on the Tivoli Storage Manager server to route the request through the firewall. This software routes the server request through a socks port on the firewall. This is typically called *socksifying* a system. Proxies are not supported, since they only route a few types of communication protocols (HTTP, FTP, GOPHER). Tivoli Storage Manager communications are not routed by proxies. It is important to note that the client creates a new connection to the Tivoli Storage Manager server when prompted. This means that the firewall configuration discussed above must be in place.

- The server cannot log events to a Tivoli Enterprise Console server across a firewall.

In an enterprise environment, we strongly recommend that you use the Tivoli Storage Manager Secure Web Administrator Proxy for Web administration of the Tivoli Storage Manager server. Install the proxy on a Web server that sits on the firewall so that the Web server can access resources on both sides of the firewall (this is sometimes called the *demilitarized zone*). When you set up the proxy, you can use it to administer any Tivoli Storage Manager server at Version 3.7 or higher. For more information on how to install and use the proxy, see the appendix about the Web proxy in the Tivoli Storage Manager Quick Start manuals listed in Table 16 on page 48.

Table 16. Tivoli Storage Manager Quick Start publications

Publication title	Order number
IBM Tivoli Storage Manager for AIX Quick Start	GC32-0770
IBM Tivoli Storage Manager for HP-UX Quick Start	GC32-0774
IBM Tivoli Storage Manager for Linux Quick Start	GC23-4692
IBM Tivoli Storage Manager for OS/390 and z/OS Quick Start	GC32-0777
IBM Tivoli Storage Manager for OS/400 PASE Quick Start	GC23-4696
IBM Tivoli Storage Manager for Sun Solaris Quick Start	GC32-0780
IBM Tivoli Storage Manager for Windows Quick Start	GC32-0784

Registering your workstation with a server (required root user or authorized user task)

Root user or Authorized User

Before you can use Tivoli Storage Manager, your node must be registered with the server. The process of setting up a node name and password is called *registration*. There are two types of registration: *open* and *closed.* Your Tivoli Storage Manager administrator chooses the type of registration for your site.

If you plan to use a Web client, you must have an administrative user ID with system privilege, policy privilege, client access authority, or client owner authority. When a new node is registered, an administrative user ID is automatically created for the node. By default, this node has client owner authority.

Using closed registration

With closed registration, a Tivoli Storage Manager administrator must register your workstation as a client node with the server. If your enterprise uses closed registration, you must provide the following information to your Tivoli Storage Manager administrator:
- Your node name (the value returned by the **hostname** command or the node name you specified with the **nodename** option). If you do not specify a node name with the **nodename** option, the default login ID is the name that the **hostname** command returns.
- The initial password you want to use, if required.
- Contact information, such as your name, user ID, and phone number.

In addition to possibly defining certain options in your options file, your Tivoli Storage Manager administrator defines the following for you:
- The policy domain to which your client node belongs. A policy domain contains policy sets and management classes, defined by your Tivoli Storage Manager administrator, that control how Tivoli Storage Manager manages the files you back up and archive.
- Whether you can compress files before sending them to the server.
- Whether you can delete backup and archive data from server storage.

Using open registration

With open registration, a system administrator can register your workstation as a client node with the server.

The first time you start a session, Tivoli Storage Manager prompts you for information necessary to register your workstation with the server identified in your client options file. You need to supply your node name, a password, and contact information.

When you use open registration:
- Your client node is assigned to a policy domain named **standard**.
- You can define whether or not to compress files before sending them to the server. See "Compression" on page 181 for more information about the *compression* option.
- You can delete archived copies of files from server storage, but not backup versions of files.

If necessary, your Tivoli Storage Manager administrator can change these defaults later.

Associating your client node with a host system (optional)

The GUIDs help uniquely identify a particular machine (for reporting purposes), regardless of how many node names are used on the machine or which network adapter is used to connect to the Tivoli Storage Manager server, or which Tivoli Storage Manager servers the nodes connect to. For example, if you use nodes GORDON, DONNA, and DAGORDON to connect to a Tivoli Storage Manager server from your desktop machine, all three nodes will have the same GUID. Similarly, if nodes GORDON, DONNA, and DAGORDON connect to multiple Tivoli Storage Manager servers, each server will show the same GUID for these nodes.

Note: The GUID is available only on AIX, Linux86, and Solaris. You must be a root user to run tivguid.

When you install the Tivoli software, the tivguid program is run to generate a GUID which is stored in the /etc/tivoli directory on a UNIX system. The GUID for a client node on the server can change if the host system machine is corrupted, if the file entry is lost, or if a user uses the same node name from different host systems. You can perform the following functions from the command line:
- Create a new GUID
- View the current GUID
- Write a specific value
- Create another GUID even if one exists.

Table 17 describes the GUID functions and the associated commands.

Table 17. GUID commands

Function	Enter on the command line:
Create and store a new GUID on the host if one does not exist. If a GUID already exists, the current value is displayed.	tivguid -Create
Display help for the tivguid commands.	tivguid -Help
Return the value of the current GUID.	tivguid -Show

Table 17. GUID commands (continued)

Function	Enter on the command line:
Write the GUID that is specified in the -GUID option to the file. For example, -Write GUID = 'string' uses the value in 'string' rather than creating a new GUID. The string must be a valid Tivoli GUID (32 hexadecimal values). This function is useful in the following cases: • If the Tivoli GUID is corrupted you can use the administrative client to query the server for the value using the q node nodename f=d command, and set that value on the current machine. • If you want to set up multiple physical machines with the same guid (for example on cluster).	`tivguid -Write -guid=38.70.92.a1.9a.93` `.11.d6.a2.f9.00.04.ac.dd.76.38`
Create a new GUID even if one exists.	`tivguid -Write -New`

Creating an include-exclude list (optional root user or authorized user task)

Authorized User

This is an optional task but an important one. If you do not create an include-exclude list, Tivoli Storage Manager considers all files for backup services and uses the default management class for backup and archive services. For information on management classes and policy domains, see Chapter 8, "Understanding storage management policies," on page 135.

You can create an include-exclude list to exclude a specific file or groups of files from backup services, and to assign specific management classes to files. Tivoli Storage Manager backs up any file that is not explicitly excluded. You should exclude Tivoli Storage Manager client directories from backup services. You can use the **query inclexcl** command to display a list of include and exclude statements in the order they are examined when determining whether an object is to be included.

Attention: There are some system files that you should exclude. See "Excluding system files" on page 54 for more information.

Specify the include-exclude list in your client system options file (dsm.sys). If you define more than one server in your dsm.sys file, each server must have its own include-exclude list. This list can also contain include-exclude statements obtained from the include-exclude files you specify with the *inclexcl* option.

When the client processes include-exclude statements, the include-exclude statements within the include-exclude file are placed at the position occupied by the *inclexcl* option in dsm.sys, in the same order, and processed accordingly.

See "Inclexcl" on page 230 for important detailed information about specifying an include-exclude file using the *inclexcl* option.

You can use the following method to create an include-exclude list or specify an include-exclude file:

1. From the client GUI, open the **Edit** menu and select **Preferences**.
2. In the Preferences dialog, click the **Include/Exclude** category.

You can create an include-exclude list by performing the following steps:

1. Determine your include and exclude requirements.
2. Locate the server stanza in your client system options file (dsm.sys).

   Note: Each server stanza must have its own include-exclude list.

3. Enter your *include* and *exclude* statements using the appropriate include-exclude options as described in "Using include-exclude options." Tivoli Storage Manager evaluates all *exclude.fs* and *exclude.dir* statements *first* (regardless of their position within the include-exclude list), and removes the excluded file spaces, directories, and files from the list of objects available for processing. All other include-exclude statements are processed from the bottom of the list up. Therefore, it is important to enter all your include-exclude statements in the proper order. For example, in the following include-exclude list the `includefile.txt` file *is not* backed up:

   ```
   include /home/usr/includefile.txt
   exclude /home/usr/.../*
   ```

   However, in the following include-exclude list the `includefile.txt` file *is* backed up:

   ```
   exclude /home/usr/.../*
   include /home/usr/includefile.txt
   ```

4. Save the file and close it.
5. Restart your Tivoli Storage Manager client to enable your include-exclude list.

Using include-exclude options

This section provides the following information:

- Brief descriptions of the *include* and *exclude* options that you can specify in your client system options file (dsm.sys). See table references for more information about each option.
- A minimum include-exclude list that excludes system files.
- A list of supported wildcard characters that you can use to include or exclude groups of files for processing.
- Examples of how you might use wildcard characters with *include* and *exclude* patterns.

Excluding file spaces and directories

Use *exclude.fs* and *exclude.dir* statements to exclude file spaces and all files and sub-directories in the specified directory from processing. Tivoli Storage Manager evaluates all *exclude.fs* and *exclude.dir* statements *first* (regardless of their position within the include-exclude list), and removes the excluded file spaces, directories, and files from the list of objects available for processing. The *exclude.fs* and *exclude.dir* statements override all include statements that match the pattern.

Table 18. Options for excluding file spaces and directories

Option	Description	Page
exclude.fs	Excludes file spaces matching the pattern. The client does not consider the specified file space for processing and the usual deleted-file expiration process cannot occur. If you exclude a file space that was previously included, existing backup versions remain on the server subject to retention rules specified in the associated management class definition. See "Exclude options" on page 208 for more information.	208
exclude.dir	Excludes a directory, its files, and all its subdirectories and their files from backup processing. For example, the statement exclude.dir /test/dan/data1 excludes the /test/dan/data1 directory, its files, and all its subdirectories and their files. Using the *exclude.dir* option is preferable over the standard *exclude* option to exclude large directories containing many files that you do not want to back up. You cannot use *include* options to override an *exclude.dir* statement. Only use *exclude.dir* when excluding an entire directory branch.	208

Controlling symbolic link processing

After Tivoli Storage Manager evaluates all *exclude.fs* and *exclude.dir* statements and removes the excluded file spaces and directories, Tivoli Storage Manager evaluates any include-exclude statements for controlling symbolic link processing (*exclude.attribute.symlink* and *include.attribute.symlink*) against the remaining list of objects available for processing. Table 19 defines options for controlling symbolic link processing.

Table 19. Options for controlling symbolic link processing

Option	Description	Page
exclude.attribute.symlink	Excludes a file or a group of files that are symbolic links from backup processing only.	208
include.attribute.symlink	Includes a file or a group of files that are symbolic links within broad group of excluded files for backup processing only.	231

Controlling backup, archive, and image processing

After Tivoli Storage Manager evaluates all *exclude.fs, exclude.dir, exclude.attribute.symlink*, and *include.attribute.symlink* statements, the following options are evaluated against the remaining list of objects available for processing.

Table 20. Options for controlling backup, archive, and image processing

Option	Description	Page
Backup processing		
exclude *exclude.backup* *exclude.file* *exclude.file.backup*	*These options are equivalent.* Use these options to exclude a file or group of files from backup services and space management services (if the HSM client is installed). The *exclude.backup* option only excludes files from normal backup, but not from HSM.	208
include *include.backup* *include.file*	*These options are equivalent.* Use these options to include files or assign management classes for backup processing.	231
Archive processing		
exclude.archive	Excludes a file or group of files from archive services.	208

Table 20. Options for controlling backup, archive, and image processing (continued)

Option	Description	Page
include *include.archive*	*These options are equivalent.* Use these options to include files or assign management classes for archive processing.	231
Image processing		
exclude.image	Excludes from image backup mounted file systems and raw logical volumes that match the pattern when used with the **backup image** command. This option is valid for AIX, HP-UX, Solaris, Linux86, Linux IA64, Linux iSeries, and Linux pSeries.	208
exclude.fs.nas	Excludes file systems on the NAS filer from an image backup when used with the **backup nas** command. If you do not specify a NAS node name, the file system identified applies to all NAS filers. The **backup nas** command ignores all other exclude statements including *exclude.fs* and *exclude.dir* statements. This option is for AIX and Solaris clients *only*.	208
include.image	Includes a file space or logical volume, assigns a management class, or allows you to assign one of several image backup processing options to a specific logical volume when used with the **backup image** command. The **backup image** command ignores all other include options. This option is valid for AIX, HP-UX, Solaris, Linux86, Linux IA64, Linux iSeries, and Linux pSeries only.	231
include.fs.nas	Use the *include.fs.nas* option to bind a management class to Network Attached Storage (NAS) file systems. You can also specify whether Tivoli Storage Manager saves Table of Contents (TOC) information during a NAS file system image backup, using the *toc* option with the *include.fs.nas* option in your client system options file (dsm.sys). See "Toc" on page 321 for more information. This option is valid for AIX and Solaris clients *only*.	231

Controlling compression and encryption processing

After Tivoli Storage Manager evaluates *exclude.fs, exclude.dir*, and any other include-exclude options controlling symbolic links, backup, archive, and image processing, it uses the following options to determine which files undergo compression and encryption processing.

Table 21. Options for controlling compression and encryption processing

Option	Description	Page
Compression processing		
exclude.compression	Excludes files from compression processing if *compression*=*yes* is specified. This option applies to backups and archives.	208
include.compression	Includes files for compression processing if *compression*=*yes* is specified. This option applies to backups and archives.	231
Encryption processing		
exclude.encrypt	Excludes files from encryption processing.	208

Table 21. Options for controlling compression and encryption processing (continued)

Option	Description	Page
include.encrypt	Includes files for encryption processing.	231

Excluding system files

Note: Objects that have a type of *rhap* and a creator of *lcmt* will be excluded from processing. Generally, these are special file system objects, but can also be created with the **mknod** command or are Unix mount points. An entry will be made in the error log indicating which objects have been skipped.

We recommend that you have the following minimum include-exclude list in your include-exclude options file:

```
exclude /unix/
exclude.dir /unix/
exclude /.../core
```

These are system files that cannot be recovered without possibly corrupting the operating system.

Including and excluding groups of files

To specify groups of files that you want to include or exclude, use the wildcard characters listed in Table 22. This table applies to *include* and *exclude* statements *only*. For information about using wildcard characters in Tivoli Storage Manager commands, see "Using wildcard characters" on page 350.

Notes:

1. A very large include-exclude list may decrease backup performance. Use wildcards and eliminate unnecessary include statements to keep the list as short as possible.

2. You can also use the *filelist* option to include a list of files for backup, restore, archive, or retrieve operations without using wildcard characters. See "Filelist" on page 212 for more information.

Table 22. Wildcard and other special characters

Character	Function
?	The match one character matches any single character *except* the directory separator; it does not match the end of the string. For example: • The **pattern** ab?, **matches** abc, but **does not match** ab, abab, or abzzz. • The **pattern** ab?rs, **matches** abfrs, but **does not match** abrs, or abllrs. • The **pattern** ab?ef?rs, **matches** abdefjrs, but **does not match** abefrs, abdefrs, or abefjrs. • The **pattern** ab??rs, **matches** abcdrs, abzzrs, but **does not match** abrs, abjrs, or abkkkrs.
*	The match-all character. For example: • The **pattern** ab*, **matches** ab, abb, abxxx, but **does not match** a, b, aa, bb. • The **pattern** ab*rs, **matches** abrs, abtrs, abrsrs, but **does not match** ars, or aabrs, abrss. • The **pattern** ab*ef*rs, **matches** abefrs, abefghrs, but **does not match** abefr, abers. • The **pattern** abcd.*, **matches** abcd.c, abcd.txt, but **does not match** abcd, abcdc, or abcdtxt.
/...	The match-*n* character matches zero or more directories.

Table 22. Wildcard and other special characters (continued)

Character	Function
[	The open character-class character begins the enumeration of a character class. For example: `xxx[abc] matches xxxa, xxxb, or xxxc.`
–	The character-class range includes characters from the first character to the last character specified. For example: `xxx[a-z] matches xxxa, xxxb, xxxc, ... xxxz.`
\	The literal escape character. When used within a character class, it treats the next character literally. When used outside of a character class, it is not treated in this way. For example, if you want to include the ']' in a character class, enter [...\]...]. The escape character removes the usual meaning of ']' as the close character-class character.
]	The close character-class character ends the enumeration of a character class.

Examples using wildcards with include and exclude patterns

Table 23 contains examples of ways you might use wildcard characters with *include* and *exclude* patterns. For more information about using the *exclude.backup* option, see "Exclude options" on page 208.

Note: In the client system options file (dsm.sys), the *include* and *exclude* options do not work with symbolic links to directories. For example, do not use /u in your include or exclude statements because /u is a symbolic link to the /home directory. Instead of entering:

```
include /u/tmp/save.fil
```

enter:

```
include /home/tmp/save.fil
```

However, the *exclude* option does work with symbolic links to directories when you enter a backup command with the absolute path that contains the symbolic link.

Table 23. Using wildcard characters with include and exclude patterns

Task	Pattern
Exclude all files during backup with an extension of *bak*, except those found on the /usr file system in the dev directory.	`exclude *.bak` `include /usr/dev/*.bak`
Exclude all files and directories in any tmp directory that might exist, *except* for the file /home/tmp/save.fil. Include this file.	`exclude /.../tmp/.../*` `include /home/tmp/save.fil`
Exclude any .o file in any directory on the /usr1, /usr2, and /usr3 file systems.	`exclude /usr[1-3]/.../*.o`
Exclude the .o files found in the root directory in the usr2 file system *only*.	`exclude /usr2/*.o`
Exclude any file that resides under the tmp directory found in any file system.	`exclude /.../tmp/.../*`
Exclude the entire directory structure /var/spool from all processing.	`exclude.dir /var/spool`
Exclude a single file system from backup processing.	`exclude.fs /fs1`
Exclude all file systems mounted anywhere in the /test/myfs/fs01 and /test/myfs/fs02 directory tree from backup processing.	`exclude.fs /test/myfs/.../*` `exclude.fs /test/myfs/*`

Table 23. Using wildcard characters with include and exclude patterns (continued)

Task	Pattern
Exclude the /home/mydir/test1 directory and any files and subdirectories under it.	`exclude.dir /home/mydir/test1`
Exclude all directories under the /home/mydir directory with names beginning with test.	`exclude.dir /home/mydir/test*`
Exclude all directories directly under the /mydir directory with names beginning with test, on any file system.	`exclude.dir /.../mydir/test*`
Exclude the raw logical volume from image backup.	`exclude.image /dev/hd0`
Exclude all symbolic links from backup processing, except those that exist under the /home/spike directory.	`exclude.attribute.symlink  /.../*` `include.attribute.symlink /home/spike/.../*`

Processing include and exclude options

The Tivoli Storage Manager server can define include-exclude options using the *inclexcl* parameter in a client option set. The include-exclude statements specified by the server are evaluated along with those in the client system options file (dsm.sys). The server include-exclude statements are always enforced and placed at the bottom of the include-exclude list and evaluated before the client include-exclude statements.

If the client system options file (dsm.sys) include-exclude list contains one or more *inclexcl* options that specify include-exclude files, the include-exclude statements in these files are placed in the list position occupied by the *inclexcl* option and processed accordingly.

When performing an incremental backup, Tivoli Storage Manager evaluates all *exclude.fs* and *exclude.dir* statements *first*, and removes the excluded file spaces, directories, and files from the list of objects available for processing. See "Excluding file spaces and directories" on page 51 and "Exclude options" on page 208 for more information about the *exclude.fs* and *exclude.dir* options.

After evaluating all *exclude.fs* and *exclude.dir* statements, Tivoli Storage Manager evaluates the include-exclude statements for controlling symbolic link processing (*exclude.attribute.symlink* and *include.attribute.symlink*) from the bottom up and stops if it finds an include or exclude statement that matches the file it is processing. After the include-exclude statements for controlling symbolic link processing are processed, Tivoli Storage Manager evaluates the remaining include-exclude list from the bottom up and stops when it finds an include or exclude statement that matches the file it is processing. The order in which the include and exclude options are entered therefore affects which files are included and excluded. See Chapter 9, "Using processing options," on page 145 for more information about the order in which all options are processed.

To display a list of all include-exclude statements in effect on your client workstation in the actual order they are processed, use the **query inclexcl** command. See "Query Inclexcl" on page 396 for more information.

The client program processes the list of include-exclude statements according to the following rules:

1. Files are checked; directories are *only* checked if the *exclude.dir* option is specified.

2. **File names are compared to the patterns in the include-exclude list from the bottom up.** When a match is found, the processing stops and checks whether the option is *include* or *exclude*. If the option is *include*, the file is backed up. If the option is *exclude*, the file *is not* backed up.

> **Note:** A very large include-exclude list may decrease backup performance. Use wildcards and eliminate unnecessary include statements to keep the list as short as possible.

3. If a match *is not* found, files are implicitly included and backed up.
4. When a file is backed up, it is bound to the default management class unless it matched an *include* statement that specified a different management class name, in which case the file is bound to that management class.

The following examples demonstrate *bottom up* processing.

Example 1

Assume that you defined the following statements for the *include* and *exclude* options:

```
exclude *.o
include /home/foo/.../*.o
exclude /home/foo/junk/*.o
```

The file being processed is: /home/foo/dev/test.o. Processing follows these steps:

1. Rule 3 (the last statement defined) is checked *first* because of bottom-up processing. The pattern /home/foo/junk/*.o does not match the file name that is being processed.
2. Processing moves to Rule 2 and checks. This time, pattern /home/foo/.../*.o matches the file name that is being processed. Processing stops, the option is checked, and it is *include*.
3. File /home/foo/dev/test.o is backed up.

Example 2

Assume that you defined the following statements for the *include* and *exclude* options:

```
exclude *.obj
include /home/foo/.../*.o
exclude /home/foo/junk/*.o
```

The file being processed is: /home/widg/copyit. Processing follows these steps:
1. Rule 3 is checked and finds no match.
2. Rule 2 is checked and finds no match.
3. Rule 1 is checked and finds no match.
4. Because a match is not found, file /home/widg/copyit.bat is implicitly included and backed up.

Example 3

Assume that you defined the following statements for the *include* and *exclude* options:

```
exclude /.../*.o
include /home/foo/.../*.o
exclude /home/foo/junk/*.o
```

The current file being processed is: /home/lib/objs/printf.o. Processing follows these steps:
1. Rule 3 is checked and finds no match.

2. Rule 2 is checked and finds no match.
3. Rule 1 is checked and a match is found.
4. Processing stops, the option is checked, and it is *exclude*.
5. File /home/lib/objs/printf.o is not backed up.

Example 4

Assume that you defined the following statements for the *include* and *exclude* options:

```
exclude.attribute.symlink /.../*
exclude /.../*.o
include /home/foo/.../*.o
exclude /home/foo/junk/*.o
```

The current file being processed is: /home/lib/objs/printf.o. Processing follows these steps:

1. The *exclude.attribute.symlink* statement is checked first. If the printf.o file is a symbolic link it will be excluded, otherwise proceed to the next step. Note that the *exclude.attribute.symlink* statements are always processed before the other include-exclude statements, regardless of their position in the include-exclude list.

2. Rule 3 is checked and finds no match.

3. Rule 2 is checked and finds no match.

4. Rule 1 is checked and a match is found.

5. Processing stops, the option is checked, and it is *exclude*.

6. File /home/lib/objs/printf.o is not backed up.

Chapter 3. Getting started

This chapter includes instructions for the following tasks:

Tivoli Storage Manager client authentication

When using the backup-archive GUI, command line client, or the Web client, you can logon using a node name and password *or* administrative user ID and password. Tivoli Storage Manager prompts for your user ID and compares it to the configured node name. If they match, Tivoli Storage Manager attempts to authenticate the user ID as a node name. If the authentication fails or if the user ID does not match the configured node name, the client attempts to authenticate the user ID as an administrative user ID.

To use an administrative user ID with any of the backup-archive clients, the user ID must have one of the following authorities:

System privilege
> Authority over the entire system. An administrator with system privilege can perform any administrative task.

Policy privilege
> Authority over the node policy domain. Allows an administrator to manage policy objects, register client nodes, and schedule client operations for client nodes.

Client owner
> Authority over the registered Tivoli Storage Manager client node. You can access the client through the Web client or native backup-archive client. You own the data and have a right to physically gain access to the data remotely. You can back up and restore files on the same or different machine, and you can delete file spaces or archive data.

Client access
> To use the Web Client to back up and restore files on a remote client machine, you must have an administrative user ID with client access authority over the node name for the remote client machine. If you do not want Tivoli Storage Manager administrators with client access authority over your node name to be able to back up and restore files on your machine, specify the ***revokeremoteaccess*** option in your client user options file (dsm.opt). See "Revokeremoteaccess" on page 288 for more information

Client access authority only allows Tivoli Storage Manager administrators to back up and restore files on remote machines. They do not have physical access to the data. That is, they cannot restore the data belonging to the remote machine to their own machines. To restore data belonging to a remote machine to your own machine, you must possess at least client owner authority.

To determine what authority you have, you can use either of the following methods:

- From the main Tivoli Storage Manager GUI window, select **File** → **Connection Information**.
- Use the Tivoli Storage Manager server QUERY ADMIN command from the administrative command line client. See the appropriate *Tivoli Storage Manager Administrator's Reference* for more information about the QUERY ADMIN command.

Starting a GUI session

The Tivoli Storage Manager GUI must be run from the X Window System. If you see the Tivoli Storage Manager icon on your desktop, Tivoli Storage Manager is already running. Double-click the icon to open the Tivoli Storage Manager window. If the Tivoli Storage Manager icon does not display on your desktop, you should start Tivoli Storage Manager using the **dsm** (starts the Motif GUI) or the **dsmj** (starts the Java GUI) command. Tivoli Storage Manager can run as either a *foreground* or *background* process.

To run the Java or Motif GUI in the foreground, enter:

```
    dsmj
or
    dsm
```

To run the Java or Motif GUI in the background, enter:

```
    dsmj &
or
    dsm &
```

Tivoli Storage Manager locates the *client user options* file (dsm.opt) and starts with the options specified in that file. See Chapter 2, "Configuring Tivoli Storage Manager," on page 33 for more information about the client user options file.

Using your Tivoli Storage Manager password

Your Tivoli Storage Manager administrator can require you to use a password to connect to the server. Tivoli Storage Manager prompts you for the password if one is required. Contact your Tivoli Storage Manager administrator if you do not know your password. For information about changing your password, see "Changing your password" on page 65.

Setup Wizard

When the GUI client starts, it checks to see whether a client user options file exists. If the client user options file does not exist (which usually happens after you have installed the client for the first time on your machine), the setup wizard will automatically start and guide you through the configuration process. You can launch the setup wizard at any time to modify your client configuration files. To do this from the main Motif GUI window, select **Utilities** → **Setup Wizard**.

Attention: If you are using the setup wizard in the Java GUI, a new dsm.opt and dsm.sys is created, overwriting the existing dsm.opt or dsm.sys file. For the Tivoli Storage Manager 5.2.0 release, it is recommended that you use the Motif GUI for configuration purposes. *The Java GUI should only be used for initial setup if a previous dsm.opt or dsm.sys file does not exist, otherwise, existing dsm.opt or dsm.sys files will be overwritten.*

You can launch the Preferences editor at any time to modify your client configuration files. To do this, select **Edit** → **Preferences** from the Java GUI main window.

The setup wizard is not available through the Web client.

Starting a command line session

You can start a command line session using one of the following methods:

- On the command line, change directory to the Tivoli Storage Manager installation directory and enter **dsmc** followed by the command, if you want to run a single command (*batch mode*). If the /usr/bin (Solaris) or opt/bin directory contains a symbolic link to the Tivoli Storage Manager installation directory, you can enter the **dsmc** command from any directory. Otherwise you can enter the fully qualified name.
- On the command line, change directory to the Tivoli Storage Manager installation directory and enter **dsmc**. This places you in *interactive mode*, permitting you to run several commands without preceding each with **dsmc**.

Your Tivoli Storage Manager administrator can require you to use a password to connect to the server. Tivoli Storage Manager prompts you for the password if one is required. If you do not know your password, contact your Tivoli Storage Manager administrator.

You can start a client command session in either batch or interactive mode.

Using batch mode

Use *batch* mode to enter a single client command. When you use batch mode, you must precede the command with **dsmc**.

For example, to archive the file archive /home/proj1/file1.txt, enter the command:

```
dsmc archive /home/proj1/file1.txt
```

To issue the **incremental** command, enter the following at the command prompt:

```
dsmc incremental
```

Depending upon the current setting of your *passwordaccess* option, Tivoli Storage Manager may prompt you for your password before you enter a command in a batch mode session. See "Passwordaccess" on page 264 for more information.

When you type your password and press Enter, the password does not display on your screen. If Tivoli Storage Manager is unable to authenticate your ID and password, you cannot use Tivoli Storage Manager services.

Using interactive mode

Use *interactive* mode when you want to issue a series of commands. Because Tivoli Storage Manager establishes the connection to the server only once for interactive mode, you can process a series of commands more quickly in interactive mode than in batch mode.

To start a client command session in interactive mode, enter either of the following commands:
- `dsmc`
- `dsmc loop`

When you press **Enter**, this prompt is displayed on your screen:

```
tsm>
```

When you are in interactive mode, do not precede commands with **dsmc**. For example, instead of typing **dsmc archive** to archive a file, type only **archive**.

For example, to archive a file named archive /home/proj1/file1.txt, enter the command:

```
archive /home/proj1/file1.txt
```

Note: In interactive mode, you cannot enter a file specification that contains national language characters. If a command contains national characters, process the command in batch mode by preceding the command with the executable program name, **dsmc**.

Depending upon the current setting of your *passwordaccess* option, Tivoli Storage Manager may prompt you for your password before you enter a command in an interactive session.

When you type your password and press Enter, the password does not display on your screen. If Tivoli Storage Manager is unable to authenticate your ID and password, you cannot use Tivoli Storage Manager services.

See "Options handling in interactive mode" on page 347 for a discussion of how options are handled in interactive mode.

See Chapter 10, "Using commands," on page 343 for more information on how to start and use the command line client.

Starting: Additional considerations

You can include options as arguments to **dsm**, **dsmj**, and **dsmc** commands. For example, you can use options to modify the format that displays dates, times, and numbers, or to include your password so that Tivoli Storage Manager does not prompt for it.

In addition, if you have more than one server defined in the client system options file (dsm.sys) and you want to contact a different server for backup-archive services (other than the one specified in your client user options file dsm.opt), specify the server with the *servername* option. For example:

```
dsmj -servername=server_b
```

Starting a Web client session

After installing the Web client on your workstation (see "Configuring the Web client" on page 43) you can use the Web client to perform backup, archive, restore, and retrieve operations from any browser that is at least Java Runtime Environment (JRE) 1.3.1 Swing-enabled. The Web client facilitates the use of assistive devices for users with disabilities and contains improved keyboard navigation. The native look and feel of the platform running the browser is preserved. The Web client will use most desktop font and color settings when run in browsers on Windows platforms.

The Web client runs on the following browsers:
- Netscape Navigator 6.0 or higher.
- Netscape Navigator 4.7 or higher with JRE 1.3.1 or higher.
- Microsoft Internet Explorer 5.0 or higher with JRE 1.3.1_01 or higher.
- Mozilla 1.4 or higher with JRE 1.3.1 or higher (AIX and Linux clients only)

To run the Web Client from Netscape browsers, **Enable JavaScript** must be checked. This setting is enabled by default, but to verify it:
1. Open Netscape Navigator's **Edit** menu and select **Preferences**.
2. In the Preferences dialog under Category, select **Advanced**.
3. Ensure there is a check mark next to **Enable JavaScript**.

For Microsoft Internet Explorer browsers, you must enable the **Scripting of Java applets**. This setting is also enabled by default. You can verify this by following these steps:

1. Open the **Tools** menu and select **Internet Options**
2. From the Internet Options dialog, select the **Security** tab.
3. Click the Web content zone in which you will be using the Storage Manager Web client and then click the **Custom Level** button.
4. In the Security Settings dialog, ensure that **Enable** is selected under the **Scripting of Java applets** setting.

If your browser does not have the correct JRE level, the Web client will notify you and if possible, will try to automatically install the correct JRE for you.
- The Web Client will let you know if your browser does not have the correct JRE level. For Microsoft Internet Explorer on Windows platforms, the Web client will automatically download and install JRE 1.3.1_01.
- On all platforms except for AIX and Internet Explorer browsers on Windows platforms, the Web client will tolerate the JRE at level 1.3.0 and will not prompt to install a later version to avoid installing more than one JRE on a machine. If you experience problems with the Web Client using JRE 1.3.0, you should install JRE 1.3.1 or higher.

If you have JRE 1.3.0 or lower installed, consider the following:
- Uninstall any existing JREs before installing the new JRE.
- Do not install the new JRE in the same directory as the existing JRE. This can cause JRE-related problems or crashes.

You can download and install JRE 1.3.1 or higher versions (unless otherwise noted) manually from the appropriate URL:
- For Windows, Solaris, Linux:

  `http://java.sun.com/j2se/1.3/jre/`
- AIX:

```
http://www-106.ibm.com/developerworks/java/jdk/aix/index.html
```
- HP-UX:

```
http://www.hp.com/products1/unix/java/java2/sdkrte1_3/downloads/index.html
```
- Macintosh OS X, Version 10.1:

  Comes with the required JRE support in the operating system. The Internet Explorer 5.1 browser for Macintosh OS X, Version 10.1 fully supports the required JRE.

Note: Note for proxy server users: The JRE 1.3.1 may return a security exception or a `class not found` exception if the Storage Manager Web Client attempts to open a TCP/IP socket to a socks server to communicate with the Storage Manager Remote Client Agent. To avoid this, you can use one of the following methods to bypass a proxy server, allowing the Web client to establish a direct connection to the Agent machine:

- **Change your Java plug-in settings**:

  For Windows:

  1. Open the Windows **Start** menu and select **Settings** → **Control Panel**.
  2. In the Control Panel, double-click **Java Plugin**.
  3. In the Java Plug-In Control Panel, select the **Proxies** tab and uncheck the **Use browser settings** check box.

  For UNIX:

  1. Change directory to the installation directory of your JRE, and then change directory to the `bin` directory.
  2. Run the `JavaPluginControlPanel` executable and click the **Proxies** tab.
  3. Uncheck **Use browser settings**.

- **Change your browser settings to enable a direct connection to the Internet**:

  - For Netscape Navigator: Open the **Edit** menu and select **Preferences**. Under Category, expand the **Advanced** section, select **Proxies**, and click **Direct connection to the Internet**.

  - For Internet Explorer: Open the **Tools** menu and select **Internet Options...**. Select the **Connections** tab, and click the **LAN Settings** button. Uncheck the **Use a proxy server** check box.

Additional information about running Swing applets can be found in Sun's Java Tutorial:

```
http://java.sun.com/docs/books/tutorial/uiswing/start/swingApplet.html
```

You can back up and restore your own data, or an Tivoli Storage Manager administrator can centralize the backup or restore operations of many clients.

To use the Web client, specify the URL of the client workstation running the Web client in your Web browser. You also need to specify the HTTPport number defined on the client workstation; the default is 1581. For example:

```
http://myhost.mycompany.com:1581
```

Note: Entering a different URL or pressing the browser **Back** button during an operation disconnects the Web client and causes the current operation to end. However, Tivoli Storage Manager backup and restore activities running in conjunction with a NAS box will continue after disconnect.

Setting user privileges

If you plan to use the Web client, ensure that you were assigned an administrative user ID with system privilege, policy privilege, client access authority, or client owner authority. When a new node is registered with the server, by default it is given an admin ID of the same node name with client owner authority. See "Tivoli Storage Manager client authentication" on page 59 for more information about these authorities.

Note: You can use the *revokeremoteaccess* option to prevent a Tivoli Storage Manager administrator with client access privilege from performing client operations on your workstation through the Web client. However, Tivoli Storage Manager administrators with client owner privilege, system privilege, or policy privilege can still perform client operations on your workstation through the Web client. See "Revokeremoteaccess" on page 288 for more information about the *revokeremoteaccess* option. See "Tivoli Storage Manager client authentication" on page 59 for more information about access authorities.

Starting the client scheduler automatically

Root User

You can add a command to the inittab file to start the client scheduler when the system boots up without any users logged in. If the Tivoli Storage Manager administrator has defined schedules for your node, starting the client scheduler permits you to automatically back up your workstation (or perform other scheduled actions). See Chapter 7, "Automating tasks," on page 129 for more information about the client scheduler.

You can also use the Tivoli Storage Manager Client Acceptor daemon to manage the scheduler. See "Configuring the client scheduler" on page 44 for more information.

Changing your password

Your Tivoli Storage Manager administrator can require you to use a password to connect to the server. Tivoli Storage Manager prompts you for the password if one is required. Contact your Tivoli Storage Manager administrator if you do not know your password.

To change your password from the GUI:
1. From the main window, open the **Utilities** menu and select **Change password**.
2. Enter your current and new passwords, and enter your new password again in the **Verify password** field.
3. Click **Change**.

To change your password from the command line client, enter:
```
dsmc set password
```

Then, enter your old and new passwords when prompted.

A Tivoli Storage Manager password can be up to 63 characters. Valid characters are:

Character	Description

A–Z	Any letter; A through Z, upper or lower case
0–9	Any number; 0 through 9
+	Plus
.	Period
_	Underscore
-	Hyphen
&	Ampersand

A password is not case sensitive. See "Password" on page 263 for additional password information.

The following are additional password information sources:
- "Starting the client scheduler automatically" on page 65
- "Starting: Additional considerations" on page 62
- "Password" on page 263
- "Set Password" on page 432

Sorting file lists using the Tivoli Storage Manager GUI

Table 24. Working with your files using the Tivoli Storage Manager GUI

Task	Procedure
Displaying files	To display files in a directory, click the folder icon next to the directory name. The files appear in the File List box on the right.
Sorting the file list	• Select one of the **Sort by** items from the **View** menu bar. • Click the appropriate column heading in the File List box.
Display active and inactive backup versions	• Click the **Display Active/Inactive Files** option from the **View** menu. • Click the **Display both active and inactive files** tool on the tool bar.
Display only active backup versions	• Click the **Display active files only** option from the **View** menu. • Click the **Display both active and inactive files** tool on the tool bar.
Selecting files to restore or retrieve.	• Click the selection box next to the directory or file name that you want to restore or retrieve. • Highlight the files that you want to restore or retrieve and click the Select Items tool on the tool bar. • Highlight the files that you want to restore or retrieve and click the **Select Items** option from the **Edit** menu.
Deselecting files	• Click the checked selection box next to the directory or file name. • Highlight the files that you want to deselect and click the Deselect Items tool on the tool bar. • Highlight the files that you want to deselect and click the **Deselect Items** option from the **Edit** menu.
Displaying file information	• Highlight the file name, and click the **View File Details** button on the tool bar. • Highlight the file name, and select **File Details** from the **View** menu. • Highlight the files that you want to deselect and click the **Deselect Items** option from the **Edit** menu.

Notes:

1. Using the Tivoli Storage Manager GUI, you can sort a list of files by various attributes, such as name, directory, size, or modification date. Sorting files by the last backup date can be useful in determining what date and time to use for the point-in-time function (see "Performing point-in-time restores" on page 106).

2. An *active* file is the most recent backup version of a file that existed on your workstation when you ran your last backup. All other backup versions of that

file are *inactive*. Only active backup versions of files are displayed, unless you select the **Display active/inactive files** menu option. If you delete the file from your workstation, the active version becomes inactive the next time you run an incremental backup.

On the command line client, you can use the ***inactive*** and ***pick*** options with query and restore commands to display both active and inactive objects. See "Inactive" on page 229 and "Pick" on page 267 for more information.

Displaying online help

You can display online help in any of the following ways:
- **From the Tivoli Storage Manager GUI:**
  - Place the cursor on an option or field of interest and press F1.
  - Open the **Help** menu.
  - Click the **Help** button in the current window.
- **From the Web client:**
  - Select the **Help** menu.
  - Click the **Help** button in current window.
- **From the dsmc command line:** Enter the **help** command. A menu of topics is displayed for which help is available. See "Help" on page 374 for more information about the **Help** command.

Ending a session

You can end a Tivoli Storage Manager client session in any one of the following ways:
- **From the Tivoli Storage Manager native or Web client GUI:**
  - Open the **File** menu and select **Exit**.
  - Open the **System** menu and select **Close**.
  - **For the Web client:** Open a different URL or close the browser.
- **From the DSMC command line:** In batch mode, each **dsmc** command you enter is a complete session. Tivoli Storage Manager ends the session when it finishes processing the command. To end an interactive session, enter **quit** at the tsm> prompt.

Online forum

To participate in user discussions of Tivoli Storage Manager you can subscribe to the ADSM-L list server. This is a user forum maintained by Marist College. While not officially supported by IBM, Tivoli Storage Manager developers and other IBM support staff also participate on an informal, best-effort basis. Because this is not an official IBM support channel, you should contact IBM Technical Support if you require a response specifically from IBM. Otherwise there is no guarantee that IBM will respond to your question on the list server.

You can subscribe by sending a note to the following e-mail address:

listserv@vm.marist.edu

The body of the message must contain the following:

SUBSCRIBE ADSM-L yourfirstname yourlastname

The list server will send you a response asking you to confirm the subscription request. Once you confirm your subscription request, the list server will send you further instructions. You will then be able to post messages to the list server by sending e-mail to:

```
ADSM-L@vm.marist.edu
```

If at a later time you want to unsubscribe from ADSM-L, you can send a note to the following e-mail address:

```
listserv@vm.marist.edu
```

The body of the message must contain the following:

```
SIGNOFF ADSM-L
```

You can also read and search the ADSM-L archives, join discussion forums, and access other resources at the following URL:

```
http://www.adsm.org
```

Other sources of online help

An anonymous FTP server is available where you can find PTF maintenance and other Tivoli Storage Manager-related materials. Four other anonymous servers are unofficially maintained by non-IBM volunteers. These servers are:

```
ftp.software.ibm.com/storage (primary - IBM)
ftp.rz.uni-karlsruhe.de (mirror - Germany)
ftp.wu-wien.ac.at (mirror - Austria)
ftp.cac.psu.edu (mirror - Pennsylvania)
```

You can get maintenance information from the Tivoli Storage Manager support page at:

```
http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html
```

Also see "Contacting customer support" on page xvi for product support information.

Chapter 4. Backing up your data

Use Tivoli Storage Manager to maintain a set of backup versions of your file system or raw logical volumes on your workstation. You can recover these older file versions in the event your current files are lost or damaged. This chapter covers different ways to back up files, how to restore these files, and the difference between backing up and archiving files.

All client backup procedures in this chapter also apply to the Web client, except the following:
- Estimate
- Searching and Filtering
- Preferences editor

See "Starting a Web client session" on page 63 for information on starting the Web client.

The following table identifies tasks described in this chapter:

Table 25. Backup: Primary tasks

Task	Page
Planning your backups	69
Pre-backup considerations	70
Performing an incremental, selective, or incremental-by-date backup	74
Group backup: Backing up files from one or more file spaces	81
Performing an image backup	81
Backing up NAS file systems	87
Backing up the WebSphere Application Server (WAS)	90

Planning your backups

If you are a first-time user, or if you only back up files occasionally, you may wish to use Table 26 as a checklist of preliminary steps to consider before performing a backup.

Table 26. Planning your backups

___	Decide whether you want to back up files or archive them. See "Do you want to back up or archive files?" on page 70 for more information.
___	See "Pre-backup considerations" on page 70 for important considerations before you back up your files and directories.
___	Do you need to exclude files from backup services? See "Using an include-exclude options list to control processing" on page 71 for more information.

Table 26. Planning your backups (continued)

___	Decide what type of backup you want according to your needs. See the following sections for more information: • "Performing an incremental, selective, or incremental-by-date backup" on page 74 • "Group backup: Backing up files from one or more file spaces" on page 81 • "Performing an image backup" on page 81 • "Backing up NAS file systems" on page 87 • "Backing up the WebSphere Application Server (WAS)" on page 90
___	If you are performing an image backup, ensure that you have accounted for unique considerations. See "Performing an image backup" on page 81 for more information.
___	For further backup considerations, see "Backup: Additional considerations" on page 94.

Do you want to back up or archive files?

When the backup-archive client backs up or archives a file, it sends a copy of the file and its associated attributes to the server; however, backups and archives have different goals.

Backups protect against file damage or loss that could occur through accidental deletion, corruption, disk crashes, and so forth. The server maintains one or more backup versions for each file that you back up. Older versions are deleted as newer versions are made. The number of backup versions the server maintains is set by your administrator.

Note: If you frequently create archives for the same data, consider using instant archives (backup sets) instead. Frequent archive operations can create a large amount of metadata in the server database increasing database growth and decreasing performance for operations such as expiration. See "Restoring data from a backup set" on page 109 for more information on how backup sets can be generated and restored.

Archive copies are saved for long-term storage. Your administrator can limit how long archive copies are kept. The server can store an unlimited number of archive versions of a file. Archives are useful if you need to go back to a particular version of your files, or you want to delete a file from your workstation and retrieve it at a later time, if necessary. For example, you might need to save spreadsheets for tax purposes, but because you are not using them, you do not want to leave them on your workstation. See Chapter 6, "Archiving and retrieving your data," on page 121 for more information about archiving and retrieving files.

Use backups to protect against unforeseen damage to your files, and use archives for long-term retention of your files.

Pre-backup considerations

Incremental backup performance suffers if the workstation has a low amount of memory available before starting the backup. If your workstation is memory constrained, specify the ***memoryefficientbackup*** *yes* option in your client options file (dsm.opt). This reduces memory consumption but increases backup time. Tivoli Storage Manager analyzes only one directory at a time for backup consideration. If

performance remains poor, check your communication buffer settings and the communication link between your workstation and the server. If your workstation is not memory constrained, setting the *memoryefficientbackup* option to *yes* will degrade your backup performance.

LAN-free data movement

AIX, HP-UX, Linux86, Linux pSeries, Linux iSeries, and Solaris clients support LAN-free data movement, which shifts the movement of client data from the communications network to a storage area network (SAN). This decreases the load on the Tivoli Storage Manager server.

The SAN provides a path that allows you to back up, restore, archive, and retrieve data to and from a SAN-attached storage device. Client data moves over the SAN to the storage device via the Tivoli Storage Manager Storage Agent. The Tivoli Storage Manager Storage Agent must be installed on the same system as the client.

LAN-free prerequisites

To enable LAN-free support, you must install and configure the Tivoli Storage Manager Managed System for SAN Storage Agent on the client workstation. For more information, refer to the following publications:

- *IBM Tivoli Storage Manager for AIX Storage Agent User's Guide*, GC32-0771
- *IBM Tivoli Storage Manager for Sun Solaris Storage Agent User's Guide*, GC32-0781
- *IBM Tivoli Storage Manager for HP-UX Storage Agent User's Guide*, GC32-0727
- *IBM Tivoli Storage Manager for Linux Storage Agent User's Guide*, GC23-4693

LAN-free options

After installing and configuring the Tivoli Storage Manager Managed System for SAN feature on the client workstation, you can use the following options to enable LAN-free data movement:

enablelanfree
> Specifies whether to enable an available LAN-free path to SAN-attached storage device. See "Enablelanfree" on page 202 for more information.

lanfreecommmethod
> Specifies a communication protocol between the client and the Storage Agent. See "Lanfreecommmethod" on page 237 for more information.

lanfreetcpport
> Specifies the TCP/IP port number where the Storage Agent is listening. See "Lanfreetcpport" on page 240 for more information.

lanfreeshmport
> Specifies the Shared Memory port number where the Storage Agent is listening. See "Lanfreeshmport" on page 239 for more information.

Using an include-exclude options list to control processing

There may be files in your file systems that you do not want to back up. These files may be core files, local caches of network file systems, operating system or application files that could be easily recovered by reinstalling the program, or any other files that you could easily rebuild.

An Authorized User on your workstation can use the *exclude* and *include* options in your include-exclude options list to specify which files to exclude from backup processing.

Use the *include* and *exclude* options in the client system options file (dsm.sys) to define which files to include or exclude from incremental or selective backup processing. A file is eligible for backup unless excluded by an *exclude* option. It is not necessary to use an *include* option to include specific files for backup unless those files are in a directory containing other files you want to exclude.

For more information on creating an include-exclude options file, see "Creating an include-exclude list (optional root user or authorized user task)" on page 50.

Encrypting data during backup or archive operation

You can encrypt the data that is sent to the server during a backup or archive operation using standard DES 56-bit encryption. If you use the DES 56-bit encryption feature to encrypt your data during backup or archive, you *must* have the encryption key to restore or retrieve the data. If the encryption key is not available on the client machine (via the *encryptkey* option) and you forgot the encryption key, then the data *cannot* be restored or retrieved under any circumstances.

Use the *include.encrypt* and *exclude.encrypt* options to select files for encryption processing. By default, files are not encrypted unless they are explicitly included using the *include.encrypt* option. For more information about the *exclude.encrypt* option, see "Exclude options" on page 208. For more information about the *include.encrypt* option, see "Include options" on page 231.

To encrypt file data, you must select an encryption key password, which Tivoli Storage Manager uses to generate the encryption key for encrypting and decrypting the file data. Store the encryption key password for later use. You can specify whether to save the encryption key password in a file named TSM.PWD by using the *encryptkey* option. While restoring the encrypted file, Tivoli Storage Manager will prompt you for the key password to decrypt the file in the following cases:
• If the *encryptkey* option is set to Prompt.
• If the key supplied by the user in the above case does not match.
• If the *encryptkey* option is set to Save and the locally saved key password does not match the encrypted file.

For more information about this option, see "Encryptkey" on page 204.

File system and ACL support

Special file systems contain dynamic information generated by the operating system; they contain no data or files. The UNIX client ignores special file systems and their contents. Special file systems include the following:
• the /proc file system on most of the UNIX platforms
• the /dev/fd file system on Solaris
• the /dev/pts on Linux

Tivoli Storage Manager provides ACL support for the client file systems in Table 27 on page 73.

Table 27. Supported file systems and ACL support

Platform	File System	ACL Support
AIX	jfs	yes
	gpfs	yes
	JFS2	yes
	VxFS	yes
	IBM TotalStorage SAN File Systems (AIX 5.1 only)	no
HP-UX	hfs	yes
	VxFS (JFS Veritas)	yes (V3.3.Layout 4)
Linux86, Linux IA64	xfs	yes
Linux iSeries	ext2	yes
Linux pSeries	ext3	yes
	jfs	no
	reiserfs	no
	gpfs	yes (Linux86 only)
Linux/390	ext2	yes
	ext3	yes
	reiserfs	no
OS/390 UNIX	hfs	no
	zfs	yes
Solaris	ufs	yes
	VxFS	yes
	QFS	no

Notes:

1. The standalone package LSCqfs 3.5.0 is the only supported version of QFS. In addition, the following restrictions also apply to the QFS file system:

   - Image backup is not supported on QFS file systems.

   - The Solaris backup-archive client does not support the combination of QFS and SAM needed to archive files onto tertiary background storage, such as tapes. Instead, it recalls files from tape to disk automatically if it finds migrated files during a backup.

   - A QFS file system contains two hidden system files and a system directory that cannot be backed up. This is acceptable because a backup of these files is not needed. They contain internal data to manage the file system. This data will be automatically excluded from a backup and recreated automatically by the file system itself if a restore of files in that file system is invoked.

   - For IBM TotalStorage SAN File Systems on AIX, the following are not supported:
     – Extended ACLs are not supported.
     – Image backup of IBM TotalStorage SAN File Systems.
     – Cross-platform backup and restore is not supported. For example, data backed up by an AIX client will not be available for restore by a Windows client and vice versa.
     – IBM TotalStorage SAN File System definitions such as clients, policies, containers, LUN assignments, etc.

2. Incremental, selective, filelist back up, archive, restore, and retrieve processing of the Veritas file system and its ACLs on AIX are supported. Restore of a Veritas volume on a Logical Volume Manager volume and vice-versa is allowed provided both have the same file system type. The ACL information might be lost when performing cross file system type restores.

Attention: If you are running GPFS for AIX or GPFS for Linux86 in a multi-node cluster, and all nodes share a mounted GPFS file system, Tivoli Storage Manager processes this file system as a local file system. Tivoli Storage Manager backs up the file system on each node during an incremental backup. To avoid this, you can do *one* of the following:

- Explicitly configure the *domain* statement in the client user options file (dsm.opt) to list the file systems you want that node to back up.
- Set the *exclude.fs* option in the client system options file (dsm.sys) to exclude the GPFS file system from backup services.

Maximum file size for operations

Table 28 specifies the maximum file sizes for the native file systems on Tivoli Storage Manager UNIX client platforms.

Note: The maximum file size depends on the type of a file system. The Tivoli Storage Manager client does not check any file size limit during backup, archive, restore, or retrieve operations. As long as the file system allows creation of the file, the Tivoli Storage Manager client will back up or archive the file.

Table 28. Maximum file size

Platform	Max file size (in bytes)
AIX 4.3.3 (JFS)	68,589,453,312 (64GB)
AIX 4.3.3 (GPFS)	109,951,162,777,600 (100 TB)
AIX 5.1 and 5.2 (JFS2)	1,099,511,627,264 (1TB - 512)
HP-UX	1,099,511,627,775 (1TB-1)
All Linux clients	9,223,372,036,854,775,807 (8EB-1)
OS/390 UNIX	4,294,967,295 (4GB)
Solaris	1,099,511,627,775 (1TB-1)

Performing an incremental, selective, or incremental-by-date backup

Your administrator might have set up schedules to automatically back up files on your workstation. See Chapter 7, "Automating tasks," on page 129 for information on checking and running the schedules available to you. The following sections discuss how to back up files without using a schedule.

There are two types of incremental backup: *full incremental* and *partial incremental*.

Full and partial incremental backup

If you select entire file systems, you are performing a full incremental backup. If you select a directory tree or individual files, you are performing a partial incremental backup.

The first time you run a full incremental backup, Tivoli Storage Manager backs up all the files and directories on the file systems you specify. This process can take a long time if there are a large number of files, or one or more very large files. Subsequent full incremental backups will only back up new and changed files. This allows the backup server to maintain current versions of your files, without having to waste time or space by backing up files that already exist in server storage.

Depending on your storage management policies, the server may keep more than one version of your files in storage. The most recently backed up files are active backup versions. Older copies of your backed up files are inactive versions. However, if you delete a file from your workstation, the next full incremental backup will cause the active backup version of the file to become inactive. If you need to restore a file you have deleted, and if a full incremental backup has been run since you deleted the file, then you will need to restore an inactive version of the file (assuming that a version still exists on the server). The number of inactive versions maintained by the server and how long they are retained is governed by the management policies defined by your server administrator. The purpose of the active versions is to represent which files existed on your file system at the time of the backup. See Chapter 8, "Understanding storage management policies," on page 135 for more information about storage management policies.

To perform a full or partial incremental backup using the client GUI, select the **Incremental (complete)** option from the type of backup pull-down menu on the backup window or use the **incremental** command in the command line interface. Specify file systems, directory trees, or individual files to include in the backup.

During an incremental backup, the client queries the server to determine the exact state of your files since the last incremental backup. The client uses this information to:

- Back up new files
- Back up files whose contents changed since the last backup. The client considers a file changed if any of the following attributes changed since the last backup:
    - File size
    - Date or time of last modification
    - Access Control List

  If *only* the following items change, they are updated without causing the entire file to be backed up to the server:
    - File owner
    - File permissions
    - Last access time
    - Inode
    - Group ID
- Expire backup versions of files on the server that do not have corresponding files on the workstation. The result is that files which no longer exist on your workstation will not have active backup versions on the server.
- Rebind backup versions to management classes if you change management class assignments, even if you do not back up the file.

Attention: Each directory is also backed up if it has not yet been backed up, or if its permissions or time stamp have changed since the last time it was backed up.

You can use the **preservelastaccessdate** option during a backup or archive operation to specify whether to reset the last access date to its original value following a backup or archive operation. By default, the Tivoli Storage Manager client *will not* reset the last access date of any backed up or archived files to their original value prior to the backup or archive operation. See "Preservelastaccessdate" on page 274 for more information.

Directories are counted in the number of objects backed up. To exclude directories and their contents from backup, use the **exclude.dir** option. For more about **exclude.dir**, see "Exclude options" on page 208.

Understanding which files are backed up

When you request a backup, Tivoli Storage Manager backs up a file if all of the following requirements are met:

- You do not exclude the file from backup in your include-exclude list. If you do not have an include-exclude list, all files will be candidates for backup.
- The selected management class contains a backup copy group. See Chapter 8, "Understanding storage management policies," on page 135 for more information on management classes and backup copy groups.
- The file meets the serialization requirements defined in the backup copy group. If serialization is *static* or *shared static*, and the file changes during backup, the file will not be backed up. See "Using management classes and copy groups" on page 136 for more information.
- The file meets the mode requirements defined in the backup copy group. If the mode is *modified*, the file must have changed since the last backup. If the mode is *absolute*, the file can be backed up even if it does not change. See "Using management classes and copy groups" on page 136 for more information.
- The file meets the frequency requirements defined in the backup copy group. The specified minimum number of days since the last backup must elapse before a file is backed up. See "Using management classes and copy groups" on page 136 for more information.

Incremental-by-date backup

For a file system to be eligible for incremental-by-date backups, you must have performed at least one full incremental backup of that file system. Running an incremental backup of only a directory branch or individual file will not make the file system eligible for incremental-by-date backups.

To perform an incremental-by-date backup using the GUI, select the **Incremental (date only)** option from the *type of backup* pull-down menu or use the **incrbydate** option with the **incremental** command.

The client backs up only those files whose modification date and time is later than the date and time of the last incremental backup of the file system on which the file resides. Files added by the client after the last incremental backup, but with a modification date earlier than the last incremental backup, are not backed up.

Files that were renamed after the last incremental backup, but otherwise remain unchanged, will not be backed up. Renaming a file does not change the modification date and time of the file. However, renaming a file does change the modification date of the directory in which it is located. In this case, the directory is backed up, but not the files it contains.

If you run an incremental-by-date backup of the whole file system, the server updates the date and time of the last incremental backup. If you perform an incremental-by-date backup on only part of a file system, the server does not update the date of the last full incremental backup. In this case, the next incremental-by-date backup will back up these files again.

Comparing full incremental, partial incremental, and incremental-by-date backups

Full incremental, partial incremental, and incremental-by-date all back up new and changed files. An incremental-by-date backup takes less time to process than a full

incremental backup and requires less memory. An incremental-by-date backup might not place exactly the same backup files into server storage because the incremental-by-date backup:

- Does not expire backup versions of files that you delete from the workstation.
- Does not rebind backup versions to a new management class if you change the management class.
- Does not back up files with attributes that change, unless the modification dates and times also change.
- Ignores the copy group frequency attribute of management classes.

Selective backup

Use a selective backup when you want to back up specific files or directories regardless of whether a current copy of those files exists on the server. Incremental backups are generally part of an automated system to back up entire file systems. In contrast, selective backups allow you to manually select a set of files to back up regardless of whether they have changed since your last incremental backup.

To perform a selective backup using the client GUI, see "Backing up data using the GUI" for more information. Use the **selective** command to perform a selective backup from the client command line. See "Selective" on page 427 for more information.

Unlike incremental backups, a selective backup:
- Does not cause the server to update the date and time of the last incremental.
- Backs up directory and file entries even if their even if their size, modification timestamp, or permissions have not changed.

Saving access permissions

When you back up your files, Tivoli Storage Manager also saves standard UNIX access permissions assigned to the files. Depending on your operating system, it also saves extended permissions. For example, for files on an AIX workstation, Tivoli Storage Manager saves access control lists.

Note: It is possible for an Authorized User to back up files for another user, but this should not cause ownership conflicts. The backup server will properly record that the file belongs to the original owner. The Authorized User does not need to grant the other user access to the backup versions.

Setting a virtual mount point

If you are an Authorized User and you want to back up files beginning with a specific directory within a file system, you can define that directory as a virtual mount point (see "Virtualmountpoint" on page 332).

Defining a virtual mount point within a file system provides a direct path to the files you want to back up, thus saving processing time. It is more efficient than defining the file system with the *domain* option and then using an *exclude* option to exclude the files you do not want to back up. It also allows you to store backups and archives for specific directories in separate storage file spaces.

Backing up data using the GUI

You can back up specific files, entire directories, or entire file systems from the directory tree. You can locate the files you want to back up by searching or

filtering. Filtering displays only the files matching the filter criteria for your backup. Use the Tivoli Storage Manager client GUI to back up your data as follows:

1. Click **Backup** in the Tivoli Storage Manager window. The Backup window appears.
2. Expand the directory tree if necessary. Click on the selection boxes next to the object or objects you want to back up. To search or filter files, click the **Search** icon on the tool bar.

   To search:
   a. Enter your search criteria in the Find Files (Backup) window.
   b. Click the **Search** button. The Matching Files (Backup) window appears.
   c. Click the selection boxes next to the files you want to back up and close the Matching Files (Backup) window.

   To filter:
   a. Enter your filter criteria in the Find Files (Backup) window.
   b. Click the **Filter** button. The Backup window displays the filtered files.
   c. Click the selection boxes next to the filtered files or directories you want to back up.

3. Select one of the following backup types from the pull-down menu:
   - To run an incremental backup, click **Incremental (complete)**.
   - To run an incremental-by-date backup, click **Incremental (date only)**.
   - To run a selective backup, click **Always backup**.
4. Click **Backup**. The Backup **Task List** window displays the backup processing status.

Considerations:
- To modify specific backup options, click the **Options** button. The options you select are effective during the current session *only*.
- Tivoli Storage Manager uses management classes to determine how to manage your backups on the server. Every time you back up a file, the file is assigned a management class. The management class used is either a default selected for you, or one that you assign to the file using an ***include*** option in the include-exclude options list. Select **Utilities** → **View Policy Information** from the native or Web client GUI to view the backup policies defined by the Tivoli Storage Manager server for your client node. See Chapter 8, "Understanding storage management policies," on page 135 for more information on management classes, how an Authorized User assigns management classes to files, and storage management policies.
- To perform an automatic incremental backup of your default domain, select **Actions** → **Backup Domain**. Your default domain is set with the ***domain*** option in your client user options file (dsm.opt). If you do not have the ***domain*** option set, the default domain is *all local file systems*. See "Domain" on page 194 for more information.
- You may use the Preferences editor to exclude file systems in your default domain from backup processing.
- For the Motif GUI only: To estimate the transfer time for your backup selections click the **Estimate** button. The estimated transfer is a rough calculation of the time it takes to transfer your data. This estimate is based on previous transfers of data between your workstation and the current Tivoli Storage Manager server , so you must run at least one backup operation first. The actual transfer time could be longer or shorter than the estimate due to factors like network traffic, system load on your workstation, or system load on the server. The Estimated Transfer Time field reads N/A if no files are sent to or from the current Tivoli

Storage Manager server. The estimate function also does not take into account whether or not files are excluded from backup. The assumption made by the estimation algorithm is that all the files selected will be sent to the server.

Notes:

1. The Java GUI does not have an **Estimate** button.

2. During installation, Tivoli Storage Manager creates the .adsmrc file to record statistics from the backup-archive client estimate function. The .adsmrc file resides in the directory named in the $HOME environment variable.

Backing up data using the command line

You can use the **incremental** or **selective** commands to perform backups. Table 29 shows examples of using these commands to perform different tasks. See "Incremental" on page 375 and "Selective" on page 427 for more information about these commands.

Table 29. Command line backup examples

Task	Command	Considerations
Incremental backups		
Perform an incremental backup of your client domain.	dsmc incremental	See "Incremental" on page 375 for more information about the **incremental** command. See "Full and partial incremental backup" on page 74 for detailed information about incremental backups.
Back up the /fs1 and /fs2 file systems in addition to the /home, /usr, and /datasave file systems defined in your client domain.	dsmc incremental -domain="/fs1 /fs2"	See "Domain" on page 194 for more information about the ***domain*** option.
Back up all local file systems defined in your client domain *except* for the /home file system.	dsmc incremental -domain="all-local -/home"	You cannot use the (-) operator in front of the domain keyword all-local. See "Domain" on page 194 for more information.
Back up *only* the /fs1 and /fs2 file systems.	dsmc incremental /fs1 /fs2	None
Back up all files in the /home directory and all its subdirectories.	dsmc incremental /home/ -subdir=yes	See "Subdir" on page 307 for more information about the ***subdir*** option.
Assuming that you initiated a snapshot of the /usr file system and mounted the snapshot as /snapshot/day1, run an incremental backup of all files and directories under the local snapshot and manage them on the Tivoli Storage Manager server under the file space name /usr.	dsmc incremental /usr -snapshotroot=/snapshot/day1	Tivoli Storage Manager considers the ***snapshotroot*** value as a file space name. See "Snapshotroot" on page 304 for more information.
Incremental-by-date backup		

Table 29. Command line backup examples (continued)

Task	Command	Considerations
Perform an incremental-by-date backup of your default client domain.	dsmc incremental -incrbydate	Use the ***incrbydate*** option with the **incremental** command to back up new and changed files with a modification date later than the last incremental backup stored at the server. See "Incrbydate" on page 235 for more information about the ***incrbydate*** option.
Selective backups		
Back up all files in the /home/proj directory.	dsmc selective /home/proj/	Use the **selective** command to back up specific files or directories regardless of whether they have changed since your last incremental backup. You can use wildcards to back up multiple files at once. See "Selective" on page 427 for more information about the **selective** command.
Back up all files in the the /home/proj directory and all its subdirectories.	dsmc selective /home/proj/ -subdir=yes	If you specify -***subdir***=*yes* when backing up a specific path and file, Tivoli Storage Manager recursively backs up *all* subdirectories under that path, and any instances of the specified file that exist under *any* of those subdirectories. If a subdirectory is a mounted file system, Tivoli Storage Manager does not back up the files in that subdirectory when you use the ***subdir***=*yes* option. See "Subdir" on page 307 for more information about the ***subdir*** option.
Back up the /home/dir1/h1.doc and /home/dir1/test.doc files.	dsmc selective /home/dir1/h1.doc /home/dir1/test.doc	If you specify the ***removeoperandlimit*** option with the **incremental** or **selective** commands, the 20-operand limit is not enforced and is restricted only by available resources or other operating system limits. This allows you to specify more than 20 files on a single command. See "Removeoperandlimit" on page 281 for more information about this option.
Back up a list of files in the /home/filelist.txt file.	selective -filelist=/home/filelist.txt	Use the ***filelist*** option to process a list of files. See "Filelist" on page 212 for more information.
Assuming that you initiated a snapshot of the /usr file system and mounted the snapshot as /snapshot/day1, run a selective backup of the /usr/dir1/sub1 directory tree from the local snapshot and manage it on the Tivoli Storage Manager server under the file space name /usr.	dsmc selective /usr/dir1/sub1/ -subdir=yes -snapshotroot=/snapshot/day1	Tivoli Storage Manager considers the ***snapshotroot*** value as a file space name. See "Snapshotroot" on page 304 for more information.

Group backup: Backing up files from one or more file spaces

You can use the **backup group** command to create and back up a group containing a list of files from one or more file space origins to a virtual file space on the Tivoli Storage Manager server. See "Backup Group" on page 354 for more information.

A *group backup* allows you to create a consistent point-in-time backup of a group of files that is managed as a single logical entity:

- All objects in the group are assigned to the same management class. See "Include options" on page 231 for more information about using the *include* option to bind a group to a management class.
- Existing *exclude* statements for any files in the group are ignored.
- All objects in the group are exported together.
- All objects in the group are expired together as specified in the management class. No objects in a group are expired until all other objects in the group are expired, even when another group they belong to gets expired.

A group backup can be added to a backup set. See "Restoring data from a backup set" on page 109 for more information about backup sets.

You can perform a full or differential backup using the *mode* option. See "Backup Group" on page 354 and "Mode" on page 251 for more information.

For example, to perform a full backup of all the files in the /home/dir1/filelist1 file to the virtual file space /virtfs containing the group leader /home/group1 file, enter:

```
dsmc backup group -filelist=/home/dir1/filelist1 -groupname=group1 -virtualfsname=
/virtfs -mode=full
```

Associating a local snapshot with a server file space

Use the *snapshotroot* option with the **incremental** and **selective** commands in conjunction with a third-party application that provides a snapshot of a logical volume, to associate the data on the local snapshot with the real file space data that is stored on the Tivoli Storage Manager server. The *snapshotroot* option does not provide any facilities to take a volume snapshot, only to manage data created by a volume snapshot. See "Snapshotroot" on page 304 for more information.

Performing an image backup

Root User

From your local workstation, you can back up a logical volume as a single object (image backup) on your system.

An image backup provides the following benefits:

- Backs up file systems containing a large number of files faster than a full file system (containing large number of files) incremental back up.
- Improves the speed with which Tivoli Storage Manager restores file systems containing many small files.
- Conserves resources on the server during backups since only one entry is required for the image.
- Provides a point-in-time picture of your logical volume, which might be useful if your enterprise needs to recall that information.

- Restores a corrupt file system or raw logical volume. Data is restored to the same state it was when the last logical volume backup was performed.

The traditional *static* image backup prevents write access to the volume by other system applications during the operation. Use the **imagetype**=*dynamic* option to back up the volume *as is* without remounting it read-only. Corruption of the backup can occur if applications write to the volume while the backup is in progress. In this case, run **fsck** after a restore. This option replaces the dependency on the copy serialization value in the management class to perform an image backup.

For Linux86 and Linux IA64 *only*: By default, Tivoli Storage Manager performs a *snapshot* image backup of file systems residing on a logical volume created by the Linux Logical Volume Manager, during which the volume is available to other system applications.

You can use the **imagetype** option with the **backup image** command or the **include.image** option to specify whether to perform a static, dynamic, or snapshot image backup. See "Imagetype" on page 227 for more information.

Before you perform an image backup

Before you perform an image backup, consider the following:
- A snapshot image backup requires a Version 5.1 Tivoli Storage Manager server.
- Ensure that no other application is using the volume when you run a static image backup. To ensure a consistent image during backup processing, the client will unmount and remount the volume as read only, so that no other applications can write to it. If the volume is in use when the client attempts to unmount, the backup will fail.

  If the client cannot unmount and remount the volume as read only because it is in use, and snapshot image backup is not available, you can use the **imagetype** option to force the client to perform an image backup without unmounting and remounting the volume in read-only mode. Set the **imagetype** option to *dynamic* in an **include.image** statement or from the command line. The backup can be corrupted if applications write to the volume while the backup is in progress. This can be corrected by running **fsck** after a restore to fix any corrupted blocks. See "Include options" on page 231 for more information.

  Important: If a mounted file system has nested mount points, unmount them before attempting a backup. Otherwise, Tivoli Storage Manager will be unable to unmount the volume. The file system is rendered *busy* if it contains any mounts.

  Do not include system files in an image backup because file systems being actively used cannot be unmounted.

  For AIX and Linux only: If you perform an image backup of a mounted file system which is mounted to another mount point and specified in file system table, then after completing of image backup, all mount options of this file system, except read/write state, will be lost.
- Use the **include.image** option to assign a management class to the volume image. If you do not assign a management class, the default management class is used for the image. See "Include options" on page 231 for more information. See Chapter 8, "Understanding storage management policies," on page 135 for more information about management classes.

  Note: Copy serialization is controlled by the client only for image backup using the **imagetype** option. See "Imagetype" on page 227 for more information.

- You can exclude a volume from image backup using the ***exclude.image*** option. See "Exclude options" on page 208 for more information.
- You must use the mount point for the file system volume on which you want to perform an image backup. Tivoli Storage Manager will not back up a file system volume without the use of a mount point. Back up file systems using the mounted name. For example, if /dev/lv01 is formatted as a file system mounted on /home, enter this command to perform an image backup of this volume:

  ```
  dsmc backup image /home
  ```

  Back up raw volumes using the device name. For example, if /dev/lv02 is a raw volume, enter this command to perform an image backup of this volume:

  ```
  dsmc  backup image /dev/lv02
  ```

Volume device type support for an image backup

The following table lists devices supported by the **backup image** command. A raw device might be a disk slice, a partition, or a logical volume.

Table 30. Volume device type support for an image backup

Logical volume manager	Raw device types	Sample device name	Backup image command support
AIX Logical Volume Mgr	Logical Volumes	/dev/lv00	AIX
Sun Solstice Volume Mgr	Meta Devices	/dev/md/dsk/dl	Solaris
Veritas Volume Mgr	Logical Volumes	/dev/vx/dsk/rootg/vol01 /dev/vg00/lvol01 /dev/vx/rootdg/vol01	Solaris HP-UX AIX
Raw Disk	Partitions	/dev/hda1, /dev/sda3	Linux86, Linux IA64, Linux iSeries Linux pSeries
Linux Logical Volume Mgr	Logical Volumes	/dev/myvolgroup/ myvolume	Linux86, Linux IA64, Linux iSeries Linux pSeries
Raw Disk	Disk Slices	/dev/dsk/c0tld0s0	Solaris

The client must support the raw device type on the specific platform in order to perform an image backup of a raw device. If you want to perform an image backup for a file system mounted on a raw device, the raw device must be supported. Remember to specify raw devices by their block device name.

Notes:

1. For the Linux clients, image backup is only supported on partitions with id 0x83 or logical volumes created with the Linux Logical Volume Manager. Backing up other partitions, such as extended partitions that contain mounted file systems or database data, may produce inconsistent backup data if the data changes during the image backup operation.
2. On HP-UX, raw logical volume backup does not support devices other than logical volumes, such as /dev/dsk/c0t0d1. Logical volume devices usually take the form /dev/vgXY/lvolAB. A volume group must begin with vg to be correctly detected.
3. You should not back up disk slices containing cylinder 0 on Solaris because the volume table of contents (VTOC) will be overwritten after a restore.

4. For AIX JFS clients, when doing image backup directly to tape, the *resourceutilization* option value cannot exceed the value of the MAXNUMMP on the server for that node. If it does, the backup can fail with an *Unknown System Error* message.

5. For AIX, HP-UX, and Solaris: You can perform image operations on volumes created using Veritas Volume Manager. Tivoli Storage Manager will initially support static (default) and dynamic image type for backup.

Utilizing image backup to perform file system incremental backup

There are two methods of utilizing image backups to perform efficient incremental backups of your file system. These backup methods allow you to perform point-in-time restore of your file systems and improve backup and restore performance. You can perform the backup only on formatted volumes; not on raw logical volumes. You can use one of the following methods to perform image backups of volumes with mounted file systems.

Method 1: Using image backup with file system incremental

1. Perform a full incremental backup of the file system (See "Backing up data using the GUI" on page 77 for instructions). This establishes a baseline for future incremental backups.

2. Perform an image backup of the same file system to make image restores possible. See "Performing an image backup using the GUI" on page 85 for instructions.

3. Perform incremental backups of the file system periodically to ensure that the server records additions and deletions accurately.

4. Perform an image backup periodically to ensure faster restore.

5. Restore your data by performing an incremental restore (See "Peforming an image restore using the GUI" on page 108 for instructions). Ensure that you select the **Image plus incremental directories and files** and **Delete inactive files from local** options in the Restore Options window before beginning the restore. During the restore, the client does the following:

   • Restores the most recent image on the server.

   • Deletes all the files that are inactivated on server since last image backup. Deletes all of the files restored in the previous step which are inactive on the server. These are files which existed at the time of the image backup, but were subsequently deleted and recorded by a later incremental backup.

   • Restores new and changed files from the incremental backups.

Method 2: Using image backup with incremental-by-date image backup

1. Perform an image backup of the file system. See "Performing an image backup using the GUI" on page 85 for instructions.

2. Perform an incremental-by-date image backup of the file system (See "Performing an image backup using the GUI" on page 85 for instructions). This sends only those files that were added or changed since the last image backup to the server.

3. Periodically, perform full image backups (See "Performing an image backup using the GUI" on page 85 for instructions).

4. Restore your volume by performing an incremental restore (See "Peforming an image restore using the GUI" on page 108 for instructions). Ensure that you select the **Image plus incremental directories and files** option in the Restore

Options window before beginning the restore. This will first restore the most recent image and will then restore all the incremental backups performed since that date.

Note: You should perform full image backups periodically in the following cases:
- When a file system changes substantially (more than 40%), as indicated in step 4 of method 1 and step 3 of method 2. On restore, this would provide a file system image close to what existed at the time of last incremental-by-date image backup and also improves restore time.
- As appropriate for your environment.

This will improve restore time because fewer changes are applied from incrementals.

The following restrictions apply when using method 2:
- The file system can have no previous full incremental backups.
- Incremental-by-date image backup does not inactivate files on the server; therefore, when you restore an image with the *incremental* option, files deleted after the original image backup will be present after the restore.
- If this is the first image backup for the file system, a full image backup is performed.
- If file systems are running at or near capacity, an out-of-space condition could result during the restore.

Comparing methods 1 and 2

To help you decide which method is appropriate for your environment, Table 31 is a comparison of methods 1 and 2.

Table 31. Comparing incremental image backup methods

Method 1: Using image backup with file system incremental	Method 2: Using image backup with incremental-by-date image backup
Files are expired on the server when they are deleted from the file system. On restore, you have the option to delete files which are expired on server from image.	Files are not expired on server. After the image incremental restore completes, all files deleted on the file system after the image backup will be present after the restore. If file systems are running at or near capacity, an out-of-space condition could result.
Incremental backup time is the same as regular incremental backups.	Incremental image backup is faster because the client does not query the server for each file that is copied.
Restore is much faster compared to a full incremental file system restore.	Restore is much faster compared to a full incremental file system restore.
Directories deleted from the file system after the last image backup are not expired.	Directories and files deleted from the file system after the last full image backup are not expired.

Performing an image backup using the GUI

When you perform an image backup using the client GUI **Image Backup** option, Tivoli Storage Manager honors the image type setting of the *include.image* or *imagetype* options in your client system options file (dsm.sys). If you set the image type to *snapshot*, the client performs a snapshot image backup of file systems residing on a logical volume created by the Linux Logical Volume Manager, during which the volume is available to other system applications. If you set the image type to *static*, the client will unmount and remount the volume as read-only, so

that no other applications can access it. If you do not specify either of these options, the client performs a snapshot image backup.

For the AIX, HP-UX, and Solaris clients, selecting the **Image Backup** option performs a static or dynamic image backup depending on the image type setting of the *include.image* or *imagetype* options in your client system options file (dsm.sys). If the image type is set to *static*, the client will unmount and remount the volume as read-only, so that no other applications can access it. If the image type is set to *dynamic*, the client performs the image backup without making the file system read-only during the backup. If you do not specify either of these options, the client performs a static image backup.

To create an image backup of your file system or raw logical volume, perform the following steps:

1. Click on the **Backup** button in the Tivoli Storage Manager main window. The Backup window appears.
2. Expand the directory tree and select the objects you want to back up. To back up a raw logical volume, locate and expand the **RAW** directory tree object.
   - To perform a static image backup, select **Image Backup** from the drop-down list.
   - To perform a snapshot image backup, select **Snapshot Image Backup** from the drop-down list. (Linux86, Linux IA64)
   - To perform an incremental-by-date image backup, select **Incremental image (date only)** from the drop-down list.
3. Click **Backup**. The Backup **Task List** window displays the backup processing status. The Backup Report window displays a detailed status report.

Considerations

- To modify specific backup options, click the **Options** button. The options you select are effective during the current session *only*.
- For the Motif GUI only: If you want to estimate the amount of time it takes to process your files and directories, click the **Estimate** button. The Estimated Transfer Time field reads N/A if there has not been a previous backup between the client node and the server. The estimate is based on the historical transfer rate between a given client-server combination. The Java GUI does not have an **Estimate** button.

Performing an image backup using the command line

Use the **backup image** and **restore image** commands to perform image backup and restore operations on a single volume. See "Backup Image" on page 356 and "Restore Image" on page 415 for more information.

You can use the *imagetype* option with the **backup image** command or the *include.image* option in your dsm.sys file or on the command line to specify whether to perform a static, dynamic, or snapshot image backup. See "Imagetype" on page 227 for more information.

Use the *mode* option with the **backup image** command to perform an incremental-by-date image backup that backs up only new and changed files after the last full image backup. However, this only backs up files with a changed date, not files with changed permissions. See "Mode" on page 251 for more information.

Backing up NAS file systems

Through support of Network Data Management Protocol (NDMP), Tivoli Storage Manager Windows, AIX, and Solaris servers can efficiently back up and restore network attached storage (NAS) file system images to automated tape drives or libraries that are locally attached to Network Appliance and EMC Celerra NAS file servers. *NDMP support is available only on IBM Tivoli Storage Manager Extended Edition.* See "NDMP support requirements (Extended Edition only)" on page 1 for NDMP support requirements.

For information on how to configure NDMP support on the Tivoli Storage Manager server, see the following publications:
- *IBM Tivoli Storage Manager for AIX Administrator's Guide*, GC32-0768
- *IBM Tivoli Storage Manager for Sun Solaris Administrator's Guide*, GC32-0778
- *IBM Tivoli Storage Manager for Windows Administrator's Guide*, GC32-0782

After configuring NDMP support, the server connects to the NAS device and uses NDMP to initiate, control, and monitor each backup and restore operation. The NAS device performs outboard data transfer to and from the NAS file system to a locally attached library.

The benefits of performing backups using NDMP include the following:
- LAN-free data transfer.
- High performance and scalable backups and restores.
- Backup to local tape devices without network traffic.

The following support is provided:
- Full file system image backup of all files within a NAS file system.
- Differential file system image backup of all files that have changed since the last full image backup.
- Parallel backup and restore operations when processing multiple NAS file systems.
- Choice of interfaces to initiate, monitor, or cancel backup and restore operations:
  - Web client
  - Backup-archive command line client
  - Administrative command line client (backup and restore operations can be scheduled using the administrative command scheduler)
  - Administrative Web client

The following functions are *not* supported:
- Archive and retrieve
- Client scheduling. Use server commands to schedule a NAS backup.
- Detection of damaged files.
- Data-transfer operations for NAS data stored by Tivoli Storage Manager:
  - Migration
  - Reclamation
  - Storage pool backup and restore
  - Move data
  - Export
  - Backup set generation

Backing up NAS file systems using the Web client GUI

For information on how to install and configure the Web client, see "Configuring the Web client" on page 43.

For both the Web client GUI and the command line client, you must specify *passwordaccess*=*generate* (which is a current Web client restriction for the client node) and the *authentication*=*on* must be specified at the server. You are always prompted for a user ID and password. To display NAS nodes and perform NAS functions, you must enter an authorized administrative user ID and password. The authorized administrative user ID should have at least client owner authority over both the NAS node and the client workstation node they are using either from command line or from the web.

You can use the *toc* option with the *include.fs.nas* option in your client system options file (dsm.sys) to specify whether Tivoli Storage Manager saves Table of Contents (TOC) information for each file system backup. See "Toc" on page 321 for more information. If you save TOC information, you can use Tivoli Storage Manager Web client to examine the entire file system tree and select files and directories to restore. Creation of a TOC requires that you define the TOCDESTINATION attribute in the backup copy group for the management class to which this backup image is bound. Note that TOC creation requires additional processing, network resources, storage pool space, and possibly a mount point during the backup operation.

To back up NAS file systems using the Web client GUI:
1. Click **Backup** from the main window. The Backup window displays.
2. Expand the directory tree if necessary.

   Notes:
   1. The root node called **Nodes** is not selectable. This node only appears if a NAS plug-in is present on the client machine.
   2. NAS nodes display on the same level as the client workstation node. Only nodes for which the administrator has authority appear.
   3. You can expand NAS nodes to reveal file spaces, but no further expansion is available (no file names).
3. Click the selection boxes next to the nodes or file systems you want to back up.
4. Click the type of backup you want to perform in the backup type pull-down menu. The NAS backup type list is active only when you first select NAS backup objects. **Full backup** backs up the entire file system. **Differential** backs up the changes since the most recent full backup.
5. Click **Backup**. The NAS Backup **Task List** window displays the backup processing status and progress bar. The number next to the progress bar indicates the number of bytes backed up so far. After the backup completes, the NAS Backup Report window displays processing details, including the *actual* size of the backup including the total bytes backed up.

   Note: If it is necessary to close the Web browser session, current NAS operations will continue after disconnect. You can use the **Dismiss** button on the NAS Backup **Task List** window to quit monitoring processing without ending the current operation.
6. (Optional) To monitor processing of an operation from the GUI main window, open the **Actions** menu and select **TSM Activities**. During a backup, the status bar indicates processing status. A percentage estimate does not display for differential backups.

Considerations:
- Workstation and remote (NAS) backups are mutually exclusive in a Backup window. After selecting an item for backup, the next item you select must be of the same type (either NAS or non NAS).

- Details will not appear in the right-frame of the Backup window for NAS nodes or file systems. To view information about objects in a NAS node, highlight the object and select **View** → **File Details** from the menu.
- To delete NAS file spaces, select **Utilities** → **Delete Filespaces**.
- Backup options do not apply to NAS file spaces and are ignored during a NAS backup operation.

To restore NAS file system images using the Web client GUI, see "Restoring NAS file systems" on page 111.

Backing up NAS file systems using the command line

Table 32 lists the commands and options you can use to back up NAS file system images from the command line.

Table 32. NAS options and commands

Option or command	Definition	Page
domain.nas	Use the *domain.nas* option to specify the volumes to include in your default domain for NAS backups.	199
exclude.fs.nas	Use the *exclude.fs.nas* option to exclude file systems on the NAS file server from an image backup when used with the **backup nas** command. This option is for AIX and Solaris clients *only*.	208
include.fs.nas	Use the *include.fs.nas* option to bind a management class to Network Attached Storage (NAS) file systems. You can also specify whether Tivoli Storage Manager saves Table of Contents (TOC) information during a NAS file system image backup, using the *toc* option with the *include.fs.nas* option in your client system options file (dsm.sys). See "Toc" on page 321 for more information. This option is valid for AIX and Solaris clients *only*.	231
query node	Use the **query node** command to display all the nodes for which a particular administrative user ID has authority to perform operations. The authorized administrative user ID should have at least client owner authority over both the NAS node and the client workstation node they are using either from command line or from the web.	398
backup nas	Use the **backup nas** command to create an image backup of one or more file systems that belong to a Network Attached Storage (NAS) file server.	360
toc	Use the *toc* option with the **backup nas** command or the *include.fs.nas* option to specify whether Tivoli Storage Manager saves Table of Contents (TOC) information for each file system backup.	321
monitor process	Use the **monitor process** command to display current back up and restore processes for all NAS nodes for which an administrative user has authority. The administrative user can then select one process to monitor.	382
cancel process	Use the **cancel process** command to display current back up and restore processes for all NAS nodes for which an administrative user has authority. From the display, the administrative user can select one process to cancel.	364
query backup	Use the **query backup** command with the *class* option to display information about file system images backed up for a NAS file server.	386

Table 32. NAS options and commands (continued)

Option or command	Definition	Page
query filespace	Use the **query filespace** command with the *class* option to display a list of file spaces belonging to a NAS node.	390
delete filespace	Use the **delete filespace** command with the *class* option to display a list of file spaces belonging to a NAS node so that you may choose one to delete.	368

Note: When you initiate a NAS backup operation using the command line client, GUI client, or Web client the server starts a process to initiate, control, and monitor the operation. It may take several moments before you notice progress at the command line client interface because the server must perform mount and other necessary tasks before data movement occurs.

Backing up the WebSphere Application Server (WAS)

If you installed the Data Protection for WebSphere Application Server, you can use Tivoli Storage Manager to back up the Version 5.0 WebSphere Application Server Network Deployment Manager (contains setup, application files, and configuration information) or the Application Server (contains setup, application files, and configuration information) to the Tivoli Storage Manager server. You can use this information to recover a corrupted node application or an entire node (or nodes) in the event of an accident or disaster.

Data Protection for WebSphere Application Server is a separately priced and licensed product. See *IBM Tivoli Storage Manager for Application Servers 5.2: Data Protection for WebSphere Application Server Installation and User's Guide*, SC32-9075 for environment, installation, and configuration information.

Notes:

1. Data Protection for WebSphere Application Server is only supported on a Tivoli Storage Manager Version 5.2 server and client.
2. Data Protection for WebSphere Application Server is supported on AIX, Solaris, and Linux86 clients *only*.

Data Protection for WebSphere Application Server works in conjunction with the client to back up the following data:
- The properties directory
- WebSphere 5.0 Web applications (EAR, JAR, and WAR files)
- Configuration information from the configuration repository
- Multiple instances of WebSphere Application Server

Use the Tivoli Storage Manager command line client or the Web Client to backup and restore WAS data. The native Tivoli Storage Manager GUI does not support WAS backup and restore.

Notes:

1. If WAS security is enabled, user name and password validation for Data Protection for WebSphere Application Server is required. If you do not set the WAS password for the security, the backup will failover to an offline backup. It is recommended to set the was security password to perform consistent backups. Use the **set waspassword** command to set the user name and password for each installation of WAS on your machine. You only need to perform this task once, unless you change your WAS user name or password.

You can only perform this task on the Tivoli Storage Manager command line. See "Set Waspassword" on page 433 for more information.

2. Ensure that the Application Server or Network Deployment Manager you want to back up is online and running, or the WAS backup operation will fail with the following error message:

```
Failed to lock the WebSphere Configuration Repository:
```

Backing up WAS data using the Web client

To back up the Network Deployment Manager or the Application Server using the Tivoli Storage Manager Web client:

1. Click **Backup** from the GUI main window. The Backup window appears.
2. Expand the directory tree if necessary.
3. Expand the WebSphere Application Server node to reveal the Application Server node and the Network Deployment Manager node.

   Notes:

   1. If only a single instance of WAS is present, the WebSphere Application Server tree displays only one object (<NODENAME>) under Application Server and one object (<NODENAME>) under Network Deployment Manager.
   2. If multiple instances of WAS are present, the WebSphere Application Server tree displays multiple instances of Application Server objects and Network Deployment Manager objects as <NODENAME>_<INSTANCENAME>

4. Click the selection box next to the objects that you want to back up.
5. Select the type of backup from the pull down menu:

   Full   Backs up all the files in the selected WebSphere component (Application Server or Network Deployment Manager). This is the default.

   Differential
      Backs up only new and changed files in the selected WebSphere component since the last full backup. If you select **Differential** and an active full backup does not exist, the client will perform a full backup.

6. Click **Backup**. The Backup Task List window displays the backup processing status. After the backup completes, the WAS Backup Report window displays processing details, including the actual size of the backup. If you want to re-access the Task List window after exiting and restarting the Web client, select **TSM Activities** → **Actions** from the menu.

Considerations:

- Workstation, NAS, and WAS backups are mutually exclusive in the Backup window. After selecting an item for backup, the next item you select must be of the same type.
- Details will not appear in the right-frame of the Backup window for WAS nodes. To display information about a WAS object, select the WAS object, click **View** → **File Details**.
- To delete WAS file spaces, select **Utilities** → **Delete Filespaces** from the Backup window menu bar.
- Backup options do not apply to WAS backups and are ignored during a WAS backup operation.

Backing up WAS data using the command line

Table 33 lists the commands and options you can use to back up WAS components.

Table 33. WAS options and commands

Option or command	Definition	Page
backup was	Use the **backup was** command to back up the WebSphere Application Server (WAS) setup, application files, and configuration information to a group on the Tivoli Storage Manager server.	362
mode	Use the *mode* option with the **backup was** command to specify whether perform a full or differential image backup of WebSphere Application Server (WAS) setup, application files, and configuration information.	251
washome	Use the *washome* option in your client user options file (dsm.opt) to specify an override base install path for the Application Server.	337
wasndhome	Use the *wasndhome* option in your client user options file (dsm.opt) to specify an override base install path for the Network Deployment Manager.	338
wasexphome	Use the *wasexphome* option in your client user options file (dsm.opt) to back up the WebSphere Application Server-Express.	336
wastype	Use the *wastype* option with the **backup was**, **query was**, or **restore was** commands to perform the operation on the WebSphere Application Server (WAS) Network Deployment Manager (contains setup, application files, and configuration information), the Application Server, or both.	340

See "Restoring the WebSphere Application Server (WAS)" on page 115 for information about how to restore WAS backups using the command line and Web client.

Displaying backup processing status

During a backup, by default Tivoli Storage Manager displays the status of each file it attempts to back up. Tivoli Storage Manager reports the file's size, path, file name, total number of bytes transferred, and whether the backup attempt was successful. These also display in the dsmsched.log file for scheduled commands.

The Web client and backup-archive client GUI provide a **Task List** window that displays information about files during processing. When a task completes, a **Backup Report** window displays processing details. Click the **Help** button in the Backup Report window for context help.

On the backup-archive command line the name of each file displays after it is sent to the server. The progress indicator shows overall progress. Informational messages may display as follows:

Table 34. Client command line informational messages

Informational message	Meaning
Directory-->	Indicates the directory that you back up.
Normal File-->.	Any file that is not a directory, symbolic link or special file.

Table 34. Client command line informational messages (continued)

Informational message	Meaning
`Special File-->`	Special files define devices for the system or temporary files created by processes. There are three basic types of special files: FIFO (first-in, first-out), block, and character. FIFO files are also called pipes. Pipes are created by one process to temporarily allow communication with another process. These files cease to exist when the first process finishes. Block and character files define devices. Tivoli Storage Manager processes only device and named pipe special files. Socket special files are not processed.
`Symbolic Link-->`	Indicates that Tivoli Storage Manager backs up a symbolic link.
`Updating-->`	Indicates that only the file meta data is sent, if file attributes change and not the data itself.
`Expiring-->`	Indicates an object (file or directory) on the server that no longer exists on the client is expired and made inactive on the server.
`Total number of objects inspected:`	As indicated.
`Total number of objects backed up:`	As indicated.
`Total number of objects updated:`	These are files whose attributes, such as file owner or file permissions, have changed.
`Total number of objects rebound:`	See "Binding and rebinding management classes to files" on page 143 for more information.
`Total number of objects deleted:`	This is a count of the objects deleted from the client workstation after being successfully backed up to the server. The count is zero for all backup commands.
`Total number of objects expired:`	See "Full and partial incremental backup" on page 74 for more information.
`Total number of objects failed:`	Objects can fail for several reasons. Check the `dsmerror.log` for details.
`Data transfer time:`	The total time to transfer data across the network. Transfer statistics may not match the file statistics if the operation was retried due to a communications failure or session loss. The transfer statistics display the bytes attempted to be transferred across all command attempts.
`Network data transfer rate:`	The average rate at which the network transfers data between the client and the server. This is calculated by dividing the total number of bytes transferred by the time to transfer the data over the network. The time it takes to process objects is not included in the network transfer rate. Therefore, the network transfer rate is higher than the aggregate transfer rate.

Table 34. Client command line informational messages (continued)

Informational message	Meaning
Aggregate data transfer rate:	The average rate at which Tivoli Storage Manager and the network transfer data between the client and the server. This is calculated by dividing the total number of bytes transferred by the time that elapses from the beginning to the end of the process. Both Tivoli Storage Manager processing and network time are included in the aggregate transfer rate. Therefore, the aggregate transfer rate is lower than the network transfer rate. **Note:** On occasion, the aggregate data transfer rate may be higher than the network data transfer rate. This is because the backup-archive client can have multiple simultaneous sessions with the backup server. If you set the **resourceutilization** option, Tivoli Storage Manager attempts to improve performance and load balancing by using multiple sessions when it backs up a file space or other set of files. When multiple sessions are open during backup, the data transfer time represents the sum of the times reported by all sessions. In this case, aggregate data transfer time is incorrectly reported as higher. However, when running with a single session, the aggregate data transfer rate should always be reported as lower than the network data transfer rate.
Objects compressed by:	Specifies the percentage of data sent over the network divided by the original size of the file on disk. For example, if the net data-bytes are 10K and the file is 100K, then Objects compressed by: == (1 - (10240/102400)) x 100 == 90%.
Elapsed processing time:	The active processing time to complete a command. This is calculated by subtracting the starting time of a command process from the ending time of the completed command process.
Total number of bytes transferred:	As indicated.
LanFree bytes transferred:	The total number of data bytes transferred during a lan-free operation. If the **enablelanfree** option is set to *no*, this line will not appear.

Backup: Additional considerations

This section includes topics related to incremental and selective backups. You do not need to understand this information to use Tivoli Storage Manager for basic work.

Understanding how files are stored

When you back up and archive files, Tivoli Storage Manager stores the backups and archives in a file space in storage that has the same name as the file system or virtual mount point from which the files originated.

For example, if you have a file system named /home, and you back up a file named doc1 in the /home/monnett directory, Tivoli Storage Manager stores the file in a file space named /home. If an Authorized User later defines /home/monnett as a virtual mount point, any files you back up from the /home/monnett directory, such as doc2, are stored in a file space named /home/monnett. If you enter this command:

```
dsmc query backup "/home/monnett/*"
```

Tivoli Storage Manager looks for files in the /home/monnett file space. It always looks for a file in the file space with the longest name that matches the file specification you include in a command. It locates the file named doc2 that was

backed up after the virtual mount point was defined. However, it does not locate the file named doc1 because that file was backed up before the virtual mount point was defined and the backup was stored in the /home file space.

To list or restore the doc1 file using a command, you must explicitly specify the file space name by enclosing it in braces. For example:

```
dsmc query backup "{/home}/monnett/*"
dsmc restore {/home}/monnett/doc1
```

If the authorized user subsequently removes the /home/monnett virtual mount point, and you then back up additional files in the /home/monnett directory, the backups are once again stored in the /home file space. For example, if you now back up a file named doc3 in the /home/monnett directory, it is stored in the /home file space. It is not stored in the existing /home/monnett file space.

However, because the /home/monnett file space already exists, when you try to query or restore the doc3 file, Tivoli Storage Manager looks for the file in the /home/monnett file space unless you specify the correct file space name. For example:

```
dsmc query backup "{/home}/monnett/*"
dsmc restore {/home}/monnett/doc2
```

Note: You must explicitly specify the file space name only when there can be more than one resolution to the file specification.

For example, if the following file spaces exist in storage:

```
/home
/home/monnett
/home/monnett/project1
/home/monnett/project1/planning
```

then enter:

```
dsmc query backup "/home/monnett/project1/planning/*"
```

Tivoli Storage Manager looks for files only in the /home/monnett/project1/planning file space, even if one or more of the other file spaces contains a path with the same name. But, when you enter one of the following:

```
dsmc query backup "{/home}/monnett/project1/planning/*"
dsmc query backup "{/home/monnett}/project1/planning/*"
dsmc query backup "{/home/monnett/project1}/planning/*"
```

Tivoli Storage Manager looks for files only in the /home file space, the /home/monnett file space, or the /home/monnett/project1 file space, depending on which form you use.

How special file systems are handled

Special file systems contain dynamic information generated by the operating system; they contain no data or files. The Tivoli Storage Manager client ignores special file systems and their contents. Special file systems include the following:
- the /proc file system on most of the UNIX platforms
- the /dev/fd file system on Solaris
- the /dev/pts on Linux

Understanding how files are managed

Tivoli Storage Manager uses management classes to determine how to manage your backups on the server. Every time you back up a file, the file is assigned a management class. The management class used is either a default selected for you, or one assigned to the file by an Authorized User with an ***include*** option in the include-exclude options list. The selected management class must contain a backup copy group in order for the file to be backed up.

Select **Utilities** → **View Policy Information** from the native or Web client GUI to view the backup policies defined by the Tivoli Storage Manager server for your client node. See Chapter 8, "Understanding storage management policies," on page 135 for more information on management classes, how an Authorized User assigns management classes to files, and storage management policies.

Understanding how symbolic links are handled

A UNIX symbolic link is a file that contains a pointer to another file or directory. Tivoli Storage Manager handles symbolic links differently than it does regular files and directories. In some operations, such as a backup, only the path information that the symbolic link contains is backed up. In other operations, such as archive, the file to which the symbolic link points is archived, but under the name of the symbolic link. For more information on how symbolic links are handled during an archive operation, see "Archsymlinkasfile" on page 170.

Incremental backup
— When you run an incremental backup, Tivoli Storage Manager backs up only the path information to a file or directory to which a symbolic link points. The contents of the file or the contents of files in the directory are not backed up.

Selective backup
— When you run a selective backup on a symbolic link that points to a file, Tivoli Storage Manager backs up only the path information to that file. The contents of the file are not backed up.

Restore — When you restore a symbolic link that originally pointed to a file, the symbolic link is restored, whether or not the file it points to still exists. If you restore a symbolic link that originally pointed to a directory:

- Without the files in the directory (for example, the /home/gillis/symdir/ directory), and the symbolic link does not exist on your file system, nothing is returned.

- Along with the files in the directory (for example, /home/gillis/symdir/*), and the symbolic link does not exist on your file system, Tivoli Storage Manager builds the directory on your workstation and puts the files in that directory. If the ***subdir*** option is set to *yes*, Tivoli Storage Manager recursively restores all subdirectories of the directory.

- And the symbolic link already exists on your workstation, the result depends on how the ***followsymbolic*** option is set; if it is set to:

  Yes   — The symbolic link is restored and overwrites the directory on your workstation. If the ***followsymbolic*** option is set to *yes*, a symbolic link can be used as a virtual mount point.

  No   — Tivoli Storage Manager displays an error message. No is the default.

Note: On UNIX systems, when a symbolic link is created its modification time is set to current system time and can not be changed. When restoring a symbolic link, its modification date and time is set to the date and time of the restore, not to the date and time of the symbolic link when it was backed up. As a result, Tivoli Storage Manager will back up the symbolic link again during the next incremental backup because its modification time changed since the last backup.

The following table shows symbolic link backup and restore functions along with the action taken:

Table 35. Symbolic link management table for backup and restore

Function	Action taken
Selective backup of a file.	Backs up the symbolic link only, the file is not backed up.
Selective backup of a directory.	Backs up the directory only, the symbolic link is not backed up.
Incremental backup with *subdir=no*.	Backs up the symbolic links only, files and directories pointed to are not backed up.
Incremental backup with *subdir=yes*.	Backs up the symbolic links and directories and files they point to.
Restore a symbolic link that points to a file.	The symbolic link is restored, regardless of whether the file the symbolic link points to still exists.
Restore a symbolic link that points to a directory.	The symbolic link is restored, regardless of whether the directory the symbolic link points to still exists.
Restore a symbolic link that points to a directory with *subdir=yes*, the directory still exists.	The symbolic link and files in the directory and subdirectories are restored.
Restore a symbolic link that points to a directory with *subdir=yes*, the directory and symbolic link no longer exist.	A directory is created in the directory in which the symbolic link resides and all files and subdirectories are restored to that directory; the symbolic link name is used as the new directory name.

Understanding how hard links are handled

When you back up files that are hard-linked, Tivoli Storage Manager backs up each instance of the linked file. For example, if you back up two files that are hard-linked, Tivoli Storage Manager will back up the file data twice.

When you restore hard-linked files, Tivoli Storage Manager attempts to reestablish the links. For example, if you had a hard-linked pair of files, and only one of the hard-linked files is on your workstation, when you restore both files, they will be hard-linked. The one exception to this procedure occurs if you back up two files that are hard-linked and then break the connection between them on your workstation. If you restore the two files from the server, Tivoli Storage Manager will respect the current file system and not restore the hard link.

If you do not back up and restore all files that are hard-linked at the same time, problems will occur. To ensure that hard-linked files remain synchronized, back up all hard links at the same time and restore those same files together.

Understanding how NFS hard and soft mounts are handled

When Tivoli Storage Manager connects a backup-archive client to an NFS file system, you can use either a hard mount or a soft mount. Tivoli Storage Manager uses the *nfstimeout* option setting to determine how long to wait for an NFS system call to respond before timing out; this applies to hard and soft mounts. The default is 0 seconds. This means that Tivoli Storage Manager uses the default behavior of NFS system calls.

You should be aware of the consequences of hard and soft mounts if the mount becomes stale (for example, if the server for the file system is not available).

Hard mount
> — If the NFS file system is hard mounted, the NFS daemons will try repeatedly to contact the server. The NFS daemon retries will not time out, will affect system performance, and you cannot interrupt them, but control will return to Tivoli Storage Manager when the *nfstimeout* value is reached.

Soft mount
> — If the NFS file system is soft mounted, NFS will try repeatedly to contact the server until either:
> - A connection is established
> - The NFS retry threshold is met
> - The *nfstimeout* value is reached

> When one of these events occurs, control returns to the calling program.

> **Note:** On Solaris and HP-UX, the *nfstimeout* option can fail if the NFS mount is hard. If a hang occurs, deactivate the *nfstimeout* option and mount the NFS file system soft mounted, as follows:
>
> ```
> mount -o soft,timeo=5,retry=5 machine:/filesystem /mountpoint
> ```
>
> The parameters are defined as follows:
>
> **soft**   Generates a soft mount of the NFS file system. If an error occurs, the stat() function returns with an error if the option hard is used, stat() never returns until the file system is available.
>
> **timeo=n**
> > Sets the time out for a soft mount error to *n* seconds
>
> **retry=n**
> > Set the internal retries and the mount retries to *n*, the default is 10000.

Backing up opened files

Tivoli Storage Manager looks for files that have changed between the start and the completion of the file's backup. Some files on your system may be in use, or open, when you try to back them up. Because an open file may change, a backup action might not reflect the correct contents of the file at a given time.

Consider if a file is important. Can you build the file again? If the file is not important, you may not want to back up the file. Or, if the file is important, a root user on your workstation can ensure the file is closed before back up.

If your backups run on a schedule, a root user can use the ***preschedulecmd*** option to enter a command to close the file. For example, if the open file is a database, use the database's **quiesce** command to shut down the database. A root user can use the ***postschedulecmd*** option to restart the application that uses the file after the backup completes. If you are not using a schedule for the backup, ensure that you close the application that uses the file before you start the backup.

Tivoli Storage Manager can back up the file even if it is open and gets changed during the backup. This is only useful if the file will be usable even if it changes during backup. To back up these files, assign the files a management class with the serialization *dynamic* or *shared dynamic*. See "Selecting a management class for files" on page 140 and "Displaying information about management classes and copy groups" on page 137 for information.

Using wildcard characters

You can use the operating system's wildcard characters in file specifications with Tivoli Storage Manager. These characters let you select groups of files that have similar names.

In a command, wildcard characters can only be used in the file name or extension. They cannot be used to specify destination files, file systems, or directories. When using wildcard characters in non-loop mode, as in

```
dsmc sel "/home/ledger.*"
```

enclose the parameter containing the asterisk in quotes to ensure the system does not interpret the wildcard character and produce unexpected results. Wildcard character information is covered in the following table.

* *(Asterisk)*	**Zero or more characters that match all files:**
*.cpp	With a cpp extension
hm*.*	Starting with hm, regardless of extension
hm*	Starting with hm, whether an extension exists or not
h.*	With an h somewhere in the file name, regardless of extension

? *(Question mark)*	**One character that matches all files with:**
?.cpp	The extension cpp with one, and only one, character in the file name
hm?.cpp	Three-character names beginning with hm and that have the cpp extension

* ? *(Asterisk and question mark)*	**Asterisk and question mark combinations matching:**
??hm.*	All four-character file names ending in hm., no matter what extension they have

In a path name for a file specification, you cannot specify a directory whose name contains an asterisk (*) or a question mark (?). Tivoli Storage Manager will recognize those characters only as wildcard characters.

Chapter 5. Restoring your data

Use Tivoli Storage Manager to restore backup versions of specific files, a group of files with similar names, or entire directories. Select the files you want to restore using file specification (file path, name, and extension), a directory list, or a subdirectory path to a directory and its subdirectories. UNIX socket files are skipped during restore, including socket files that were backed up with earlier versions of Tivoli Storage Manager.

All client restore procedures in this chapter also apply to the Web client, except the following:
- Estimate
- Searching and Filtering
- Preferences editor

See "Starting a Web client session" on page 63 for information on starting the Web client.

Table 36 identifies tasks described in this chapter:

Table 36. Restore: Primary tasks

Task	Page
Restoring data using the GUI	102
Restoring data using the command line	102
Performing point-in-time restores	106
Restoring an image	107
Restoring data from a backup set	109
Restoring NAS file systems	111
Restoring the WebSphere Application Server (WAS)	115
Authorizing another user to restore or retrieve your files	116
Restoring or retrieving files from another client node	117
Restore or retrieve files to another workstation	118
Restoring a disk in case of disk loss	118
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Do you want to restore an active or inactive backup?

Your administrator determines how many backup versions Tivoli Storage Manager maintains for each file on your workstation. Having multiple versions of a file permits you to restore older versions if the most recent backup is damaged. The most recent backup version is the *active* version. Any other backup version is an *inactive* version. Every time Tivoli Storage Manager backs up your files, it marks the new backup version as the active backup, and the last active backup becomes an inactive backup. When the maximum number of inactive versions is reached, Tivoli Storage Manager deletes the oldest inactive version.

To restore a backup version that is inactive, you must display both active and inactive versions by clicking on the **View** menu→ **Display active/inactive files** item. To display only the active versions (the default), click on the **View** menu → **Display active files only** item. If you try to restore more than one version at a time, only the active version is restored.

On the Tivoli Storage Manager command line, use the *inactive* option to display both active and inactive objects. See "Inactive" on page 229 for more information.

Restoring data using the GUI

To restore backup versions of individual files or subdirectories:

1. Click **Restore** from the main window. The Restore window appears.

2. Expand the directory tree. Select the selection boxes next to the files or directories you want to restore. To search or filter files, click the **Search** icon on the tool bar.

   To search:
   a. Enter your search criteria in the Find Files (Restore) window.
   b. Click the **Search** button. The Matching Files (Restore) window appears.
   c. Click the selection boxes next to the files you want to restore and close the Matching Files (Restore) window.

   To filter:
   a. Enter your filter criteria in the Find Files (Restore) window.
   b. Click the **Filter** button. The Restore window displays the filtered files.
   c. Click the selection boxes next to the filtered files or directories you want to restore.

3. To modify specific restore options, click the **Options** button. Any options you change are effective during the current session *only*.

4. Click **Restore**. The Restore Destination window appears. Enter the information in the Restore Destination window.

5. Click **Restore**. The Restore **Task List** window displays the restore processing status. Transfer statistics may not match the file statistics if the operation was retried due to a failure such as a communications failure or session loss. The transfer statistics will show the bytes attempted to be transferred across all command attempts.

Restoring data using the command line

Use the **restore** command to restore files. See "Restore" on page 407 for more information about the **restore** command. Table 37 on page 103 shows examples of using the **restore** command to restore objects from Tivoli Storage Manager server storage. See "Restore" on page 407 for additional examples.

Table 37. Command line restore examples

Task	Command	Considerations
Restore the most recent backup version of the /home/monnett/h1.doc file, even if the backup is inactive.	dsmc restore /home/monnett/h1.doc -latest	If the file you are restoring no longer resides on your workstation, and you have run an incremental backup since deleting the file, there is no active backup of the file on the server. In this case, use the *latest* option to restore the most recent backup version. Tivoli Storage Manager restores the latest backup version, whether it is active or inactive. See "Latest" on page 242 for more information.
Display a list of active and inactive backup versions of files from which you can select versions to restore.	dsmc restore "/user/project/*"-pick -inactive	If you try to restore both an active and inactive version of a file at the same time, only the active version is restored. See "Pick" on page 267 and "Inactive" on page 229 for more information.
Restore the /home/monnett/h1.doc file to its original directory.	dsmc restore /home/monnett/h1.doc	If you do not specify a destination, the files are restored to their original location.
Restore the /home/monnett/h1.doc file under a new name and directory.	dsmc restore /home/monnett/h1.doc /home/newdoc/h2.doc	None
Restore the files in the /home file system and all of its subdirectories.	dsmc restore /home/ -subdir=yes	When restoring a specific path and file, Tivoli Storage Manager recursively restores *all* subdirectories under that path, and any instances of the specified file that exist under *any* of those subdirectories. See "Subdir" on page 307 for more information about the *subdir* option.
Restore all files in the /home/mydir directory to their state as of 1:00 PM on August 17, 2002.	dsmc restore -pitd=8/17/2002 -pitt=13:00:00 /home/mydir/	See "Pitdate" on page 268 and "Pittime" on page 269 for more information about the *pitdate* and *pittime* options.
Restore all files from the /home/projecta directory that end with .bak to the /home/projectn/ directory.	dsmc restore "/home/projecta/*.bak" /home/projectn/	If the destination is a directory, specify the delimiter (/) as the last character of the destination. If you omit the delimiter and your specified source is a directory or a file spec with a wildcard, you will receive an error. If the projectn directory does not exist, it is created.
Restore files specified in the restorelist.txt file to a different location.	dsmc restore -filelist=/home/dir2/restorelist.txt /home/NewRestoreLocation/	See "Filelist" on page 212 for more information about restoring a list of files.
Restore all members of the /virtfs/group1 group backup stored on the Tivoli Storage Manager server.	dsmc restore group /virtfs/group1	See "Restore Group" on page 413 for more information.

Performing large restore operations

If you need to restore a large number of files, you can get faster performance by using the **restore** command instead of the GUI. In addition, you can improve performance by entering multiple **restore** commands at one time.

For example, to restore all the files in your /home file system, enter:

```
dsmc restore /home/ -subdir=yes -replace=all -tapeprompt=no
```

However, if you enter multiple commands for the directories in the /home file space, you can restore the files faster.

For example, you could enter these commands:

```
dsmc restore /home/monnett/ -subdir=yes -replace=all -tapeprompt=no
dsmc restore /home/gillis/ -subdir=yes -replace=all -tapeprompt=no
dsmc restore /home/stewart/ -subdir=yes -replace=all -tapeprompt=no
```

You can also use the *quiet* option with the **restore** commands to save processing time. However, you will not receive informational messages for individual files.

Note: If you already have the appropriate values set for the *subdir*, *replace*, *tapeprompt*, and *quiet* options in your client user options file, you do not need to include those options in the commands.

When you enter multiple commands to restore your files, you must specify a unique part of the file space in each **restore** command. Be sure you do not use any overlapping file specifications in the commands.

To display a list of the directories in a file space, use the **query backup** command. For example:

```
dsmc query backup -dirsonly -subdir=no /usr/
```

As a general rule, you can enter from two to four **restore** commands at one time. The maximum number you can run at one time without degrading performance depends on factors such as how much memory you have and network utilization.

The speed at which you can restore the files also depends on how many tape drives are available on the server, and whether your administrator is using collocation to keep file spaces assigned to as few volumes as possible.

For example, if /home/monnett and /home/gillis are on the same tape, the restore for /home/gillis must wait until the restore for /home/monnett is complete. However, if /home/stewart is on a different tape, and there are at least two tape drives available, the restore for /home/stewart can begin at the same time as the restore for /home/monnett.

If your administrator is using collocation, the number of sequential access media mounts required for restore operations is also reduced.

No query restore

When you enter an unrestricted wildcard source file specification on the **restore** command and do not specify any of the options: *inactive*, *latest*, *pick*, *fromdate*, or *todate*, the client uses a different method for restoring files and directories from the server. This method is called *no query restore* because instead of querying the server for each object to be restored, a single restore request is sent to the server. In this case, the server returns the files and directories to the client without further

action by the client. The client merely accepts the data coming from the server and restores it to the destination named on the **restore** command.

An example of an unrestricted wildcard file specification would be:

`/home/mydocs/2004/*`

An example of a restricted wildcard file specification would be:

`/home/mydocs/2004/sales.*`

Standard restore process

The standard restore process (also known as classic restore) and the no query restore process are outlined below.

1. The client queries the server for a list of files backed up for the client file space you want to restore.
2. The server sends a list of backed up files that match the restore criteria. If you want to restore both active and inactive files, the server sends information about all backed up files to the client.
3. The list of files returned from the server is sorted in client memory to determine the file restore order and to minimize tape mounts required to perform the restore.
4. The client tells the server to restore file data and directory objects.
5. The directories and files you want to restore are sent from the server to the client.

No query restore process

1. The client tells the server that a no query restore is going to be performed and provides the server with details about file spaces, directories, and files.
2. The server sorts the data using an internal sort table which minimizes tape mounts.
3. The data to be restored is sent to the client. File and directory objects stored on disk are sent immediately since sorting for such data is not required before restoring it.
4. You can use multiple sessions to restore the data. If the data resides on multiple tapes, there are multiple mount points available at the server. The combination of using the *resourceutilization* option and MAXNUMMP allows multiple sessions. See "Resourceutilization" on page 284 for more information.

If the restore process stops because of a power outage or network failure, the server records the point at which this occurred. This record is known to the client as a *restartable restore*. It is possible to have more than one restartable restore session. Use the **query restore** command to find out if your client has any restartable restore sessions in the server database.

You must complete a restartable restore before attempting further backups of the file system. If you attempt to repeat the restore that was interrupted or try to back up the destination file space, the attempt will fail because you did not complete the original restore. You can restart the restore at the point of interruption by entering the **restart restore** command, or you can delete the restartable restore using the **cancel restore** command. If you restart the interrupted restore, it will restart with the first transaction, which may consist of one or more files, not completely restored when the interruption occurred. Because of this, you may receive some replace prompts for files from the interrupted transaction which were already restored.

For more information on using the command line to begin restartable restores, see "Restore" on page 407. To perform restartable restores using the GUI, follow these steps:
1. Click **Help** from the Restore window.
2. Click **Restoring Backup Versions**
3. Click **Work with restartable restore sessions**.

Performing point-in-time restores

Use a *point-in-time* restore to restore files to the state that existed at a specific date and time. A point-in-time restore can eliminate the effect of data corruption by restoring data from a time prior to known corruption, or recover a basic configuration to a prior condition.

You can perform a point-in-time restore of a file space, directory, or file. You can also perform a point-in-time restore of image backups. For more information see "Backup Image" on page 356.

Perform incremental backups to support a point-in-time restore. During an incremental backup, the client notifies the server when files are deleted from a client file space or directory. Selective and incremental-by-date backups do not notify the server about deleted files. Run incremental backups at a frequency consistent with possible restore requirements.

If you request a point-in-time restore with a date and time that is prior to the oldest version maintained by the Tivoli Storage Manager server, the object is not restored to your system. Files which were deleted from you workstation prior to the point-in-time specified will not be restored.

Notes:
1. Your administrator must define copy group settings that maintain enough inactive versions of a file to guarantee that you can restore that file to a specific date and time. If enough versions are not maintained, Tivoli Storage Manager may not be able to restore all objects to the point-in-time you specify.
2. If you delete a file or directory, the next time you run an incremental backup, the active backup version becomes inactive and the oldest versions that exceed the number specified by the *versions data deleted* attribute of the management class are deleted. See Chapter 8, "Understanding storage management policies," on page 135 for more information about the *versions data deleted* attribute.

When performing a point-in-time restore, consider the following:
- Tivoli Storage Manager restores file versions from the most recent backup before the specified point-in-time date. Ensure the point-in-time that you specify is not the same as the date and time this backup was performed.
- If the date and time you specify for the object you are trying to restore is earlier than the oldest version that exists on the server, Tivoli Storage Manager cannot restore that object.
- Point-in-time restore will restore files deleted from the client workstation after the point-in-time date but not files deleted before this date.
- Tivoli Storage Manager cannot restore a file created after the point-in-time date and time. When a point-in-time restore runs, files that were created on the client after the point-in-time date are not deleted.

To perform a point-in-time restore using the client GUI, use the following steps:
1. Click the **Restore** button in the main window. The Restore window appears.

2. Click the **Point-in-Time** button from the Restore window. The Point in Time Restore window appears.
3. Select the **Use a Point-in-Time Date** selection box. Select the date and time and click **OK**. The point in time that you specified appears in the Point in Time display field in the Restore window.
4. Display the objects you want to restore. You can search for an object by name, filter the directory tree, or work with the directories in the directory tree.
5. Click the selection boxes next to the objects you want to restore.
6. Click the **Restore** button. The Restore Destination window displays. Enter the appropriate information.
7. Click the **Restore** button to start the restore. The Restore Task List window displays the restore processing status.

Note: If there are no backup versions of a directory for the point-in-time you specify, files within that directory are not restoreable from the GUI. However, you can restore these files from the command line.

You can start point-in-time restore from the command line client using the *pitdate* and *pittime* options with the **query backup** and **restore** commands. For example, when you use the *pitdate* and *pittime* options with the **query backup** command, you establish the point-in-time for which file information is returned. When you use *pitdate* and *pittime* with the **restore** command, the date and time values you specify establish the point-in-time for which files are returned. If you specify *pitdate* without a *pittime* value, pittime defaults to 23:59:59. If you specify *pittime* without a *pitdate* value, it is ignored.

Restoring an image

Before you perform an image restore, consider the following:
- Restoring the image of a volume will restore the data to the same state that it was in when you performed your last image backup. Be absolutely sure that you need to restore an image, because it will replace your entire current file system or raw volume with the image on the server.
- Ensure that the volume to which you are restoring the image is at least as large as the image that is being restored.
- The file system or volume you are restoring to must be the same type as the original.
- Ensure that the target volume of the restore is not in use. The client will lock the volume before starting the restore. The client will unlock the volume after the restore completes. If the volume is in use when the client attempts to lock the file system, the restore will fail.
- You cannot restore an image to where the Tivoli Storage Manager client program is installed.
- If you have run progressive incremental backups *and* image backups of your file system, you can perform an incremental image restore of the file system. The process restores individual files after the complete image is restored. The individual files restored are those backed up after the original image. Optionally, if files were deleted after the original backup, the incremental restore can delete those files from the base image. Incremental backups and restores can be performed only on mounted file systems, not on raw logical volumes.
- If for some reason a restored image is corrupted, you can use the **fsck** tool to attempt to repair the image.

You can use the *verifyimage* option with the **backup image** command to specify that you want to enable detection of bad sectors on the destination target volume. If bad sectors are detected on the target volume, Tivoli Storage Manager issues a warning message on the console and in the error log. See "Verifyimage" on page 330 for more information.

If bad sectors present on the target volume, you can use the *imagetofile* option with the **backup image** command to specify that you want to restore the source image to a file. Later, you can use a 'dd' utility (available on Unix) or its equivalent to copy data from this file to a logical volume. See "Imagetofile" on page 226 for more information.

Peforming an image restore using the GUI

Use the following procedure to restore an image of your file system or raw logical volume:

1. Click **Restore** from the main window. The Restore window appears.
2. Expand the directory tree.
3. Locate the object in the tree named **Image** and expand it. Click the selection box next to the image you want to restore. You can obtain detailed information about the object by highlighting the object and selecting **View** → **File Details...** from the main window or click the **View File details** button.
4. **(Optional)** To perform an incremental image restore, click the **Options** button to open the Restore Options window and select the **Image plus incremental directories and files** option. If you want to delete inactive files from your local file system, select the **Delete inactive files from local** check box. Click the **OK** button.
5. Click **Restore**. The Restore Destination window appears. The image can be restored to the volume with the mount point from which it was originally backed up. Alternatively, a different volume can be chosen for the restore location.
6. Click the **Restore** button to begin the restore. The **Task List** window appears showing the progress of the restore. The Restore Report window displays a detailed status report.

Considerations:

- You can select **View** → **File Details** from the main window or click the **View File details** button to display the following statistics about file system images backed up by the client:
  - Image Size - This is the volume size which was backed up.
  - Stored Size - This is the actual image size stored on the server. The stored image on the Tivoli Storage Manager server is the same size as the volume capacity.
  - File system type
  - Backup date and time
  - Management class assigned to image backup
  - Whether the image backup is an active or inactive copy
- To modify specific restore options, click the **Options** button. Any options you change are effective during the current session *only*.
- In the Restore Options window, you can choose to restore the image only or the image and incremental directories files. If you choose **Image Only**, you will restore the image from your last image backup only. This is the default.

If you ran incremental-by-date image backup on a volume or image backups on a volume with incrementals, you can choose the **Image plus incremental directories and files** option. If you choose **Image plus incremental directories and files**, you can also select **Delete inactive files from local** to delete the inactive files that are restored to your local file system. If incremental-by-date image backup was the only type of incremental backup you performed on the file system, deletion of files will not occur.

Attention: Be absolutely sure that you need to perform an incremental restore because it will replace your entire file system with the image from the server and then restore the files that you backed up using the incremental image backup operation.

- For the Motif GUI only: If you want to estimate the amount of time it takes to process your files and directories, click the **Estimate** button. The Estimated Transfer Time field reads N/A if there has not been a previous backup between the client node and the server. The estimate is based on the historical transfer rate between a given client-server combination. The Java GUI does not have an **Estimate** button.

Performing an image restore using the command line

Use the **restore image** command to restore an image using the Tivoli Storage Manager command line client. See "Restore Image" on page 415 for more information.

You can use the *verifyimage* option with the **restore image** command to specify that you want to enable detection of bad sectors on the destination target volume. If bad sectors are detected on the target volume, Tivoli Storage Manager issues a warning message on the console and in the error log. See "Verifyimage" on page 330 for more information.

If bad sectors are present on the target volume, you can use the *imagetofile* option with the **restore image** command to specify that you want to restore the source image to a file. Later, you can use a 'dd' utility (available on Unix) or its equivalent to copy data from this file to a logical volume. See "Imagetofile" on page 226 for more information.

Restoring data from a backup set

Your Tivoli Storage Manager administrator can generate a backup set (a collection of your active files that reside on the server) onto portable media created on a device using a format that is compatible with the client device.

It is possible to generate a backup set as a number of special files if the device class the Tivoli Storage Manager administrator specifies when creating it is *file*. These files can be stored locally (on the client) to provide more restore flexibility.

WAS and group backups can also be added to a backup set. See "Group backup: Backing up files from one or more file spaces" on page 81 for more information about group backups. See "Backing up the WebSphere Application Server (WAS)" on page 90 for more information about WAS backups.

Portable media can be used on devices such as a tape, CD-ROM, DVD, and Iomega JAZ or ZIP drives. Current device support information is available at the following Web site:

`http://www.ibm.com/software/sysmgmt/products/support/IBMTivoliStorageManager.html`

You can restore backup sets from the following locations:
- From portable media on a device attached to your client workstation
- From a backup set file on the your client workstation
- Directly from the server (You must be a root user to restore an entire backup set from the server, otherwise only files you own are restored.)

Backup sets can provide you with instant archive and rapid recovery capability as described below:

Instant archive
> This capability allows an administrator to create an archive collection from backup versions already stored on the server.

Rapid recovery
> When you are away from your office without a network connection and you lose data, you can restore the data from the backup set.

Notes:
1. If you cannot restore a backup set from portable media, check with your Tivoli Storage Manager administrator to ensure that the portable media was created on a device using a format that is compatible with your device.
2. There is no support in the Tivoli Storage Manager API for the backup set format.
3. To enable the GUI client to restore a backup set on an attached device on a UNIX standalone workstation, without requiring a server connection, use the *localbackupset* option. See "Localbackupset" on page 243 for more information.
4. Note that the **restore backupset** command supports restore of local backup sets from local media without using the *localbackupset* option.

Restoring an entire or partial backup set

Tivoli Storage Manager considers a backup set as one object containing the whole file structure. You can restore the entire backup set or just select portions. The backup set media is self-describing and contains all the information required to perform a successful restore.

Use the GUI to restore an entire backup set *only*. The command line can be used to restore an entire backup set or individual files within a backup set. See "Restore Backupset" on page 410 for information on how to use the **restore backupset** command.

Restoring backup sets using the GUI

Attention: Before you begin a restore, be aware that backup sets can contain data for multiple file spaces. If you specify a destination other than the original location, data from *all* file spaces are restored to the location you specify.

To restore a backup set, perform the following steps:
- Click **Restore** from the GUI main window. The Restore window appears.
- Locate the **Backup Sets** directory tree object and expand it by clicking the plus sign (+) beside it.
  - To restore the backup set from a local device, expand the **Local** object and the Specify backup set location dialog is displayed. On the dialog, select **File name:** or **Tape name:** from the dropdown list and then enter the tape or file name location. You can also click the **Browse** button to open a file selection window and select a backup set.

– To restore an entire backup set from the server, expand the **Server** object.

Your backup sets appear in the tree and are grouped by backup set description. Expand a backup set description to see the backup sets with that description.

- Click the selection box next to the backup set that you want to restore.
- Click **Restore**. The Restore Destination window appears. Enter the appropriate information.
- Click on **Restore**. The Task List window displays the restore processing status.

Notes:

1. If the object you want to restore is part of a backup set generated on a node, and the node name is changed on the server, any backup set objects that were generated prior to the name change will not match the new node name. Ensure that the node name is the same as the node for which the backup set was generated.
2. If the backup set is on the server, normal Tivoli Storage Manager security applies, and you can only restore your own files and files to which you have been granted access. However, normal Tivoli Storage Manager security does not apply to backup set data when restored locally because the physical media can be explored by the person who has access to it.
3. To enable the GUI client to restore a backup set on an attached device on a UNIX standalone workstation, without requiring a server connection, use the *localbackupset* option. See "Localbackupset" on page 243 for more information. The **restore backupset** command supports restore of local backup sets from local media without using the *localbackupset* option. Also, certain local devices such as tape devices require device drivers to be set up prior to performing a restore. See the device manual for assistance with this task. You will also need to know the device address in order to perform the restore.

Restoring backup sets using the command line client

The **restore backupset** command restores a backup set from the server, a local file, or a local tape device. See "Restore Backupset" on page 410 for more information

Use the *location* option with the **restore backupset** and **query backupset** commands to specify where Tivoli Storage Manager searches for a backup set during a query or restore operation. You can use this option to locate backup sets on the server or local files. Tapes that are generated on the server can be used locally by specifying the *location* option and either the file name or the tape device. See "Location" on page 244 for more information.

Use the **query backupset** command to query a backup set from a local file, tape device, or the Tivoli Storage Manager server. The **query backupset** command displays the backup set name, generation date, retention, and description. See "Query Backupset" on page 388 for more information.

Restoring NAS file systems

You restore NAS file system images using the Web client or command line interface. For information on how to install and configure the Web client, see "Configuring the Web client" on page 43.

You can restore full or differential NAS file system images that were backed up previously. If you restore a differential image, Tivoli Storage Manager automatically

restores the full backup image first, followed by the differential image. It is not necessary for a client node to mount a NAS file system to perform backup or restore operations on that file system.

Restoring NAS file systems using the Web client

For information on how to install and configure the Web client, see "Configuring the Web client" on page 43. To restore NAS file systems using the Web client GUI:

1. Click the **Restore** from the main window. The Restore window appears.
2. Expand the directory tree if necessary. To expand a node in the tree, click the plus sign (+) next to an object in the tree.

   Notes:
   1. Nodes shown are those that have been backed up and to which your administrator has authority.
   2. The root node called **Nodes** is not selectable. This node only appears if a NAS plug-in is present on the client machine.
   3. NAS nodes display on the same level as the client workstation's node. Only nodes to which the administrator has authority appear.

3. Expand the NAS node to reveal the Image object.
4. Expand the Image object to display volumes that you can restore. You cannot expand Volume objects.
5. Click the selection boxes next to the volumes under the Image object that you want to restore.

   Notes:
   1. If you want to restore a NAS image that was backed up on a particular date, click the **Point In Time** button. After you select a date, the last object that was backed up on or prior to that date appears, including any inactive objects.
   2. If you want to display all images (including active images and inactive images), before you select them, select **View** → **Display active/inactive files** from the menu bar.

6. Click **Restore**. The Restore Destination window appears. Enter the information in the Restore Destination window. If you choose to restore to a different destination, you can only restore one volume at a time to a different destination.

   Note: You can restore NAS file system images to any volume on the NAS file server from which they were backed up. You cannot restore images to another NAS file server.

7. Click **Restore**. The NAS Restore **Task List** window displays the restore processing status and progress bar. If there is a number next to the progress bar, it indicates the size of the restore, if known. After the restore completes, the NAS Restore Report window displays processing details.

   Note: If it is necessary to close the Web browser session, current NAS operations will continue after disconnect. You can use the **Dismiss** button on the NAS Restore **Task List** window to quit monitoring processes without ending the current operation.

8. (Optional) To monitor processing of an operation, select the **Actions** → **TSM Activities** from the main window.

Considerations:

- Workstation and remote (NAS) backups are mutually exclusive in a Restore window. After selecting an item for restore, the next item you select must be of the same type (either NAS or non NAS).
- Details will not appear in the right-frame of the Restore window for NAS nodes or images. To view information about a NAS image, highlight the NAS image and select **View** → **File Details** from the menu.
- To delete NAS file spaces, select **Utilities** → **Delete Filespaces**. You can delete both workstation and remote objects.

Restoring NAS files and directories using the Web client

You can use the *toc* option with the *include.fs.nas* option in your client system options file (dsm.sys) to specify whether Tivoli Storage Manager saves Table of Contents (TOC) information for each file system backup. See "Toc" on page 321 for more information. If you save TOC information, you can use Tivoli Storage Manager Web client to examine the entire file system tree and select files and directories to restore. Creation of a TOC requires that you define the TOCDESTINATION attribute in the backup copy group for the management class to which this backup image is bound. Note that TOC creation requires additional processing, network resources, storage pool space, and possibly a mount point during the backup operation. If you do not save TOC information, you can still restore individual files or directory trees using the **restore node** server command, provided that you know the fully qualified name of each file or directory and the image in which that object was backed up.

To restore NAS files and directories:
1. Click the **Restore** from the main window. The Restore window appears.
2. Expand the directory tree if necessary. To expand a node in the tree, click the plus sign (+) next to an object in the tree.

   Notes:
   1. Nodes shown are those that have been backed up and to which your administrator has authority.
   2. The root node called **Nodes** is not selectable. This node only appears if a NAS plug-in is present on the client machine.
   3. NAS nodes appear on the same level as the client workstation's node. Only nodes to which the administrator has authority appear.
3. Expand the NAS node to display the **File Level** object.
4. Expand the **File Level** object to display the volumes, directories, and files that were last backed up. When you expand the volume object, and complete TOC information is available on the server for the latest backup, the Load Table of Contents dialog appears. If complete TOC information is not available for the latest backup, no objects will appear below the volume object. The next step explains how to display objects from backups other than the latest backup. Complete TOC information is provided if you performed either of the following operations:
   - A differential image backup with TOC information and its corresponding full image backup with TOC information
   - A full image backup with TOC information
5. Click the selection boxes next to the directories or files that you want to restore. If you want to restore files from a NAS image that was backed up on a particular date or display files from several older versions, highlight the volume you want to restore and click the **Point In Time** button. If you select **Use a Point in Time Date** in the Point in Time Restore windows, files from the

image backed up on that date, and if it is a differential image, files from its corresponding full image appear under the **File Level** object. If you click **Use Selected Images** in the Point in Time Restore window, the Selected Images window appears for you to select images. The contents of the selected images appear in the **File Level** object.

6. Click **Restore**. The Restore Destination window appears. Enter the information in the Restore Destination window. If you choose to restore to a different destination, you can only restore one volume at a time to a different destination.

7. Click **Restore**. The NAS Restore **Task List** window displays the restore processing status and progress bar. If there is a number next to the progress bar, it indicates the size of the restore, if known. After the restore completes, the NAS Restore Report window displays processing details.

    Note: If it is necessary to close the Web browser session, current NAS operations will continue after disconnect. You can use the **Dismiss** button on the NAS Restore **Task List** window to quit monitoring processes without ending the current operation.

8. (Optional) To monitor processing of an operation, select the **Actions** → **TSM Activities** from the main window.

Considerations:
- Workstation, remote (NAS), and WAS backups are mutually exclusive in a Restore window. After selecting an item for restore, the next item you select must be of the same type either (either workstation, NAS, or WAS).
- To view information about objects in a NAS node, highlight the object and select **View** → **File Details** from the menu.
- To delete NAS file spaces, select **Utilities** → **Delete Filespaces**. You can delete both workstation and remote objects.

Restoring NAS file systems using the command line

Table 38 lists the commands and options you can use to restore NAS file system images from the command line.

Table 38. NAS options and commands

Option or command	Definition	Page
query node	Displays all the nodes for which a particular administrative user ID has authority to perform operations. The authorized administrative user ID should have at least client owner authority over both the NAS node and the client workstation node they are using either from command line or from the Web client.	398
query backup	Use the **query backup** command with the *class* option to display information about file system images backed up for a NAS file server.	386
query filespace	Use the **query filespace** command with the *class* option to display a list of file spaces belonging to a NAS node.	390
restore nas	Restores the image of a file system belonging to a Network Attached Storage (NAS) file server.	418
monitor process	Displays current backup and restore processes for all NAS nodes for which an administrative user has authority. The administrative user can then select one process to monitor.	382

Table 38. NAS options and commands (continued)

Option or command	Definition	Page
cancel process	Displays current back up and restore processes for all NAS nodes for which an administrative user has authority. From the display, the administrative user can select one process to cancel.	364
delete filespace	Use the **delete filespace** with the *class* option to display a list of file spaces belonging to a NAS node so that you may choose one to delete.	368

Regardless of client platform, NAS file system specifications use the forward slash (/) separator, as in this example: /vol/vol0.

Note: When you initiate a NAS restore operation using the command line client or the Web client, the server starts a process to initiate, control, and monitor the operation. It may take several moments before you notice progress at the command line client interface because the server must perform mount and other necessary tasks before data movement occurs. The Tivoli Storage Manager command line client may display an Interrupted ... message when the mount occurs. You can ignore this message.

Restoring the WebSphere Application Server (WAS)

Use the Web client GUI or command line client to restore full or differential image backups of a WebSphere Application Server if the Data Protection for WebSphere Application Server is installed. When you back up a WAS, file spaces are created on the Tivoli Storage Manager server with the naming convention WAS_INSTANCENAME (for the Application Server file space) and WAS_ND_INSTANCENAME (for the Network Deployment Manager file space).

Before you begin:
- It is strongly recommended that you restore data at the Network Deployment Manager node or Application Server node level only, rather than individual files. Restoring data other than at these levels can corrupt your WebSphere installation. See *IBM Tivoli Storage Manager for Application Servers 5.2: Data Protection for WebSphere Application Server Installation and User's Guide*, SC32-9075, for more information.
- You need to take WAS offline before you begin the restore.

To restore the WebSphere Application Server::
1. Click **Restore** from the Web client GUI main window. The Restore window appears.
2. Expand the directory tree if necessary.
3. Expand the WebSphere Application Server node to reveal the WAS_<INSTANCENAME> and WAS_ND_<INSTANCENAME> file spaces.

   Notes:
   1. The most recent active full or differential backup appears under the WebSphere Application Server tree.
   2. If only a single instance of WAS was backed up, the WebSphere Application Server tree displays only the WAS_<NODENAME> and WAS_ND_<NODENAME> file spaces.

3. If multiple instances of WAS were backed up, the WebSphere Application Server tree displays multiple instances as WAS_<INSTANCENAME> and WAS_ND_<INSTANCENAME>. The INSTANCENAME is a variation of the NODENAME.

4. Click the selection box next to the Application Server (INSTANCENAME) node or Network Deployment Manager (INSTANCENAME) node that you want to restore.

   Notes:
   1. If you want to restore objects that were backed on a particular date, click the **Point In Time** button. After you select a date, the last object that was backed up on or prior to that date appears, including inactive objects.
   2. If you want to see all active and inactive WAS backups before you select them, select **View** → **Display active/inactive files** from the menu bar. Inactive WAS backup objects are displayed with an **X** next to the object in the tree.

5. Click **Restore**. The Restore Task List window displays the restore processing status. If you want to re-access the Task List window after exiting and restarting the Web client, select **Actions** → **TSM Activities** from the menu.

Considerations:

- Workstation, NAS, and WAS restores are mutually exclusive in the Restore window. After selecting an item for restore, the next item you select must be of the same type.
- To display information about a WAS object (from the Restore window), select a WAS object, click **View** → **File Details**.
- If you need to recover a WAS file space to a new machine, you must install WebSphere Application Server, the client, and the Data Protection for WebSphere Application Server on the new machine before you can restore your WAS file space. See "Restore WAS" on page 420 for more information.
- To delete WAS file spaces, select **Utilities** → **Delete Filespaces** from the Restore window the menu bar.

To restore WAS objects from the Tivoli Storage Manager command line, use the **restore was** command. See "Restore WAS" on page 420 for more information.

Restore: Additional considerations

This section discusses some advanced considerations for restoring data. You do not need to understand this information to use Tivoli Storage Manager for basic work.

Authorizing another user to restore or retrieve your files

You can authorize another user on the same workstation or a different workstation to restore backup versions or retrieve archive copies of your files. This permits you to share files with other people or with other workstations that you use with a different node name. To authorize a user on another workstation to restore or retrieve your files, the other workstation must be running one of the UNIX clients and must be registered with your Tivoli Storage Manager server.

To authorize another user to restore or retrieve your files:

1. Click **Utilities** → **Node Access List** from the main window. The Node Access List window appears.
2. Click the **Add** button. The Add Access Rule window appears.

3. In the Add Access Rule window, select an item in the Permit Access to field to specify the type of data that the other user can access. You can select either Backed up Objects or Archived Objects.

4. Type the node name of the user's host machine that can access your data in the Grant Access to Node field.

5. Type the name of the user on a node who can access your data in the User field.

6. In the Filespace and Directory field, select the file space and the directory that the user can access. You can select one file space and one directory at a time. If you want to give the user access to another file space or directory, you must create another access rule.

7. If you want to limit the user to specific files in the directory, type the name or pattern of the files on the server that the other user can access in the Filename field. You can make only one entry in the Filename field. It can either be a single file name or a pattern which matches one or more files. You can use a wildcard character as part of the pattern. Your entry must match files that have been stored on the server.

8. For the Java GUI: If you want to give access to all files that match the file name specification within the selected directory including its subdirectories, click **Include subdirectories**.

9. Click the **OK** button to save the access rule and close the Add Access Rule window.

10. The access rule that you created is displayed in the list box in the Node Access List window. When you have finished working with the Node Access List window, click the **OK** button. If you do not want to save your changes, click **Cancel** or close the window.

On the command line client, use the **set access** command to authorize another node to restore or retrieve your files. You can also use the **query access** command to see your current list, and **delete access** to delete nodes from the list. For more information about these commands, see:
- "Set Access" on page 430
- "Query Access" on page 383
- "Delete Access" on page 366

Restoring or retrieving files from another client node

After users grant you access to their files on the server, you can restore or retrieve those files to your local system. You can display another user's file spaces on the server, restore the other user's backup versions, or retrieve the other user's archive copies to your local file system.

To display another user's file spaces on the server, restore the other user's backup versions, or retrieve the other user's archive copies to your local drives:
1. Click **Utilities** from the main window.
2. Click **Access Another Node**. The Access Another Node window appears.
3. Type the node name of the user's host machine in the Node name field. Type the user name in the User name field.
4. Click the **Set** button.

If you are using commands, use the *fromnode* and *fromowner* options to indicate the node name and the name of the user who owns the files.

For example, to restore files to one of your own file systems that were backed up from a workstation named Node1 and owned by a user named Ann, enter:

```
dsmc restore -fromn=node1 -fromo=ann "/home/proj/*" /home/gillis/
```

Use the **query filespace** command to get a list of file spaces (see "Query Filespace" on page 390). For example, to get a list of file spaces owned by Ann on Node1, enter:

```
dsmc query filespace -fromn=node1 -fromo=ann
```

See "Fromnode" on page 218 for more information about the *fromnode* option. See "Restore" on page 407 for more information about using the *fromnode* and *fromowner* options with the **restore** command. Also see "Retrieve" on page 423 for more information about the **retrieve** command.

Restore or retrieve files to another workstation

From a different workstation, you can restore or retrieve files you have already backed up from your own workstation. You must know the Tivoli Storage Manager password assigned to your node.

To restore or retrieve files to another workstation, use the *virtualnodename* option to specify the node name of the workstation from which you backed up the files. *Virtualnodename* cannot be set to the hostname of the machine. You can use the *virtualnodename* option when you start Tivoli Storage Manager or you can add the *virtualnodename* option to your client user options file dsm.opt. Use the *virtualnodename* option on the **dsm** or **dsmj** command if you are borrowing another user's machine and you do not want to update their client user options file.

Tivoli Storage Manager prompts you for the password for your original node. After you enter the correct password, all file systems from your original workstation appear in the Restore or Retrieve window. You can restore or retrieve files as if you were working on your own workstation.

Attention: When you use this method to access files, you have access to all files backed up and archived from your workstation. You are considered a virtual root user.

You can use the *virtualnodename* option in a command. For example, to restore your *projx* files, enter:

```
dsmc restore -virtualnodename=nodeone "/home/monnett/projx/*"
```

If you do not want to restore or retrieve the files to the same directory name on the alternate workstation, enter a different destination.

The considerations for retrieving files are the same as restoring files.

Restoring a disk in case of disk loss

Tivoli Storage Manager can recover your files only if you can run the client. If the file system that contains the client is lost, you must reinstall the client before you can recover your files. If you also lose the file system that contains the operating system and communication software, you must recover them before you can connect to the server.

To protect yourself against these kinds of losses, you need to put together a set of installation media that you can use to restore your system to a state that lets you contact the server and begin recovering data. The installation media should contain:

1. A bootable operating system that lets you perform basic functions.
2. A correctly configured communication program that lets you establish communications with the server.
3. A client with appropriate customized options files. You can use the command line client to complete this task.

The communication package you use determines what files you need. Consult your operating system and communication software manuals to set up your installation media.

If you also have the Tivoli Space Manager installed on your workstation, your installation media should include the space manager command line client. For information about restoring migrated files, see *IBM Tivoli Storage Manager for Space Management for UNIX User's Guide*, GC32-0794.

Note: Your administrator can schedule restore operations which can be very useful when you need to restore a large number of files.

Deleting file spaces

Authorized User

If your Tivoli Storage Manager administrator gives you authority, you can delete entire file spaces from the server. You cannot delete individual backup versions that are kept on the server. When you delete a file space, you delete all the files and images, both backup versions and archive copies, that are contained within the file space. For example, if you delete the file space for your **/home/monnet** file system, you are deleting every backup for every file in that file system and every file you archived from that file system. Carefully consider whether you want to delete a file space.

You can delete file spaces using the Tivoli Storage Manager GUI or command line clients. To delete NAS file spaces, use the Web client or command line client.

To delete a file space using the GUI, perform the following steps:
1. Select **Utilities→ Delete Filespaces** from the main window.
2. Click the selection boxes next to the file spaces you want to delete.
3. Click the **Delete** button. Tivoli Storage Manager prompts you for confirmation before deleting the file space.

You can also delete a file space using the **delete filespace** command. See "Delete Filespace" on page 368 for more information. Use the *class* option with the **delete filespace** command to delete NAS file spaces. See "Class" on page 173 for more information.

Chapter 6. Archiving and retrieving your data

Archiving and retrieving files is similar to backing up and restoring files. Many of the windows and concepts are similar. In this chapter, we cover the main archive and retrieve tasks, but where windows and concepts are the same, as for backup and restore, see Chapter 4, "Backing up your data," on page 69.

All client archive and retrieve procedures in this chapter also apply to the Web client, except the following:
- Estimate
- Searching and Filtering
- Preferences editor

See "Starting a Web client session" on page 63 for information on starting the Web client.

Table 39 identifies tasks described in this chapter:

Table 39. Archive and retrieve: Primary tasks

Task	Page
Archiving data using the GUI	122
Archiving data using the command line	122
Deleting archived files	124
Retrieving data using the GUI	125
Retrieving data using the command line	126

Archiving files

To archive files, you need to specifically select the files to archive. You can select the files by using a file specification or by selecting them from a directory tree.

Your administrator might have set up schedules to archive certain files on your workstation automatically. See Chapter 7, "Automating tasks," on page 129 for information on checking and running the schedules available to you. The following sections cover how to archive files without using a schedule.

Estimating backup processing time

For the Motif GUI: You can use the estimate function to estimate the amount of time it takes to process your files and directories. The estimated time is a rough calculation of the time it takes Tivoli Storage Manager to transfer your data and is based on previous transfers of data between your workstation and the current server. The actual transfer time could be longer or shorter than the estimate due to factors like network traffic, system load on your workstation, or system load on the server.

The Java GUI does not have the estimate function.

Archiving data using the GUI

You can archive a file or a group of files using file names, or you can select files that match your search criteria using a directory tree. Perform archives using the following procedure:

1. Click **Archive** from the main window. The Archive window appears.
2. Expand the directory tree by clicking the plus sign **(+)** or the folder icon next to an object in the tree. To search or filter files, click the **Search** icon from the tool bar.

   To search:
   a. Enter your search criteria in the Find Files (Archive) window.
   b. Click the **Search** button. The Matching Files (Archive) window appears.
   c. Click the selection boxes next to the files you want to archive and close the Matching Files (Archive) window.

   To filter:
   a. Enter your filter criteria in the Find Files (Archive) window.
   b. Click the **Filter** button. The Archive window displays the filtered files.
   c. Click the selection boxes next to the filtered files or directories you want to archive.

3. Enter the description, accept the default description, or select an existing description for your archive package in the Description box. The maximum length of a description is 254 characters. When an existing archive description is used, the files or directories selected are added to the archive package. All archived packages with the same description are grouped for retrieves, queries, and deletions.
4. To modify specific archive options, click the **Options** button. Any options you change are effective during the current session *only*. For the Motif GUI: To estimate the transfer time for your archive selections click the **Estimate** button. The Java GUI does not have an **Estimate** button.
5. Click on **Archive**. The Archive **Task List** window displays the archive processing status.

Archiving data using the command line

You request archive services when you want to preserve copies of files in their current state, either for later use or for historical or legal purposes. You can archive a single file, a group of files, or all the files in a directory or subdirectory. After you archive a file, you can choose to delete the original file from your workstation. Use the **archive** command to archive files. See "Archive" on page 352 for more information about the **archive** command.

Associating a local snapshot with a server file space

Use the *snapshotroot* option with the **archive** command in conjunction with a third-party application that provides a snapshot of a logical volume, to associate the data on the local snapshot with the real file space data that is stored on the Tivoli Storage Manager server. The *snapshotroot* option does not provide any facilities to take a volume snapshot, only to manage data created by a volume snapshot. See "Snapshotroot" on page 304 for more information.

Table 40 on page 123 shows examples of using the **archive** command to archive objects. See "Archive" on page 352 additional examples.

Table 40. Command line archive examples

Task	Command	Considerations
Archive all files in the /home/proj1 directory with a file extension of .txt.	dsmc archive ″/home/proj1/*.txt″	Use wildcards to archive more than one file at a time.
Archive all files in the /home/jones/proj/ directory and delete the files on your workstation.	dsmc archive /home/jones/proj/ -deletefiles	Retrieve the archived files to your workstation whenever you need them again. See "Deletefiles" on page 188 for more information about the *deletefiles* option.
Archive the /home/jones/h1.doc and /home/jones/test.doc files.	dsmc archive /home/jones/h1.doc /home/jones/test.doc	If you specify the *removeoperandlimit* option with the **archive** command, the 20-operand limit is not enforced and is restricted only by available resources or other operating system limits. This allows you to specify more than 20 files on a single command. See "Removeoperandlimit" on page 281 for more information about this option.
Archive a list of files in the /home/avi/filelist.txt file.	dsmc archive -filelist=/home/avi/filelist.txt	Use the *filelist* option to process a list of files. See "Filelist" on page 212 for more information.
Archive the /home/jones/ch1.doc file and assign a description to the archive.	dsmc archive /home/jones/ch1.doc -description=″Chapter 1, first version″	If you do not specify a description with the **archive** command, the default is Archive Date:x, where x is the current system date. See "Description" on page 189 for more information about the *description* option.
Archive all of the files in the /home/jones/proj/ directory and its subdirectories.	dsmc archive /home/jones/proj/ -subdir=yes	See "Subdir" on page 307 for more information about the *subdir* option.
Use the *v2archive* option with the **archive** command to archive only files in the /home/relx/dir1 directory.	dsmc archive ″/home/relx/dir1/*″ -v2archive	Tivoli Storage Manager archives only files in the /home/relx/dir1 directory. Directories that exist in the path are not processed. See "V2archive" on page 328 for more information about the *v2archive* option.
Use the *archmc* option with the **archive** command to specify the available management class for your policy domain to which you want to bind your archived files.	dsmc archive –archmc=ret2yrs /home/plan/proj1/budget.jan	See "Archmc" on page 169 for more information about the *archmc* option. See Chapter 8, "Understanding storage management policies," on page 135 for more information about management classes.
Assuming that you initiated a snapshot of the /usr file system and mounted the snapshot as /snapshot/day1, archive the /usr/dir1/sub1 directory tree from the local snapshot and manage it on the Tivoli Storage Manager server under the file space name /usr.	dsmc archive /usr/dir1/sub1/ -subdir=yes -snapshotroot=/snapshot/day1	Tivoli Storage Manager considers the *snapshotroot* value as a file space name. See "Snapshotroot" on page 304 for more information.

Deleting archived files

You can delete archive copies if you decide you no longer need them. Unlike backup versions, you can delete individual archive copies without deleting the entire file space. To delete an archive copy:

1. Click on **Utilities** from the client GUI main window.

2. Click on **Delete Archive Data**. The Archive Delete window displays.

3. Expand the directory tree. The directory tree contains groups of files identified by a description and archived to the server.

4. Click the selection boxes to select the objects you want to delete.

5. Click on **Delete**. The Archive Delete Status window displays the archive deletion processing status.

If you are using commands, you can delete archive copies with the **delete archive** command.

For example, to delete the /home/jones/t.exe file, enter:

```
dsmc delete archive /home/jones/t.exe
```

Archive: Advanced considerations

This section covers some advanced considerations in archiving files. You do not need to understand this information in order to use Tivoli Storage Manager for basic work.

Saving access permissions

When you archive a file, Tivoli Storage Manager saves standard UNIX access permissions assigned to the file. Depending on your operating system, it also saves extended permissions. For example, for files on an AIX workstation, Tivoli Storage Manager saves access control lists.

If you are a user, and you archive a file to which you have read access, you own the archived copy of the file. You are the only user who can retrieve the archived file unless you grant access to another user.

Understanding how symbolic links are handled

When you archive a symbolic link, Tivoli Storage Manager archives the file to which the symbolic link points. It does not archive path information for the directory.

If you archive a symbolic link that points to a directory, Tivoli Storage Manager archives the files contained in the directory (and its subdirectories if the *subdir* option is set to yes) under the name of the symbolic link.

Use the *archsymlinkasfile* option to specify whether Tivoli Storage Manager archives the symbolic link and the file or directory it points to, or the symbolic link only. See "Archsymlinkasfile" on page 170 for more information.

Table 41 shows symbolic link archive and retrieve functions and the action taken:

Table 41. Symbolic link management table for archive and retrieve

Function	Action taken
Archive of a file link.	Archives the file to which the symbolic link points.
Archive of a directory link.	Archives the directory and its contents.

Table 41. Symbolic link management table for archive and retrieve (continued)

Function	Action taken
Archive of a file with subdir=yes.	Archives the directory, its contents, and contents of subdirectories.
Archive of a directory with subdir=yes.	Archives the directory, its contents, and contents of subdirectories.
Archive of a symbolic link that points to a file or directory that does not exist.	Archives the symbolic link.
Retrieve a symbolic link that points to file; the file and link exist.	Replaces the file if replace=y is set.
Retrieve a symbolic link that points to file; the symbolic link no longer exists.	Retrieves the file replacing the file name with the symbolic link name and places it in the directory where the symbolic link resided.
Retrieve a symbolic link that points to a directory; the symbolic link and directory no longer exist.	A directory is created in the directory where the symbolic link resides, and all files and subdirectories are restored to that directory. The symbolic link name is used as the new directory name.
Retrieve a symbolic link that points to a directory; the symbolic link and directory still exist.	Tivoli Storage Manager will not retrieve as long as the symbolic link exists.

Understanding how hard links are handled

When you archive files that are hard-linked, Tivoli Storage Manager archives each instance of the linked file. For example, if you archive two files that are hard-linked, Tivoli Storage Manager will archive the file data twice.

When you retrieve hard-linked files, Tivoli Storage Manager attempts to reestablish the links. For example, if you had a hard-linked pair of files, and only one of the hard-linked files is on your workstation, when you retrieve both files, they will be hard-linked. The one exception to this procedure occurs if you back up two files that are hard-linked and then break the connection between them on your workstation. If you retrieve the two files from the server, Tivoli Storage Manager will respect the current file system and not retrieve the hard link.

If you do not archive and retrieve all files that are hard-linked at the same time, problems will occur. To ensure that hard-linked files remain synchronized, archive all hard links at the same time and retrieve those same files together.

Retrieving archives

Retrieve a file when you want to return an archive copy from the server to your workstation.

Many of the advanced considerations for retrieving files are the same as for restoring files. See "Authorizing another user to restore or retrieve your files" on page 116, "Restoring or retrieving files from another client node" on page 117, and "Restore or retrieve files to another workstation" on page 118.

Retrieving data using the GUI

To retrieve an archived file:

1. Click **Retrieve** from the client GUI main window. The Retrieve window appears.

2. Expand the directory tree by clicking the plus sign **(+)** or the folder icon next to an object you want to expand. To search or filter files, click the **Search** icon from the tool bar.

   To search:
   a. Enter your search criteria in the Find Files (Retrieve) window.
   b. Click the **Search** button. The Matching Files (Retrieve) window appears.
   c. Click the selection boxes next to the files you want to retrieve and close the Matching Files (Retrieve) window.

   To filter:
   a. Enter your filter criteria in the Find Files (Retrieve) window.
   b. Click the **Filter** button. The Retrieve window displays the filtered files.
   c. Click the selection boxes next to the filtered files or directories you want to retrieve.

3. To modify specific retrieve options, click the **Options** button. Any options you change are effective during the current session *only*. For the Motif GUI: To estimate the transfer time for your archived selections, click the **Estimate** button. The Java GUI does not have an **Estimate** button.

4. Click **Retrieve**. The Retrieve Destination window appears. Enter the appropriate information in the Retrieve Destination window.

5. Click **Retrieve**. The Retrieve **Task List** window displays the retrieve processing status.

Retrieving data using the command line

You *retrieve* a file when you want to return an archive copy from the server to your workstation. You can retrieve a single file, a group of files, or all the files in a directory or subdirectory. When you retrieve a file, Tivoli Storage Manager sends you a copy of that file. The archived file remains in storage.

Use the **retrieve** command to retrieve files from from storage to your workstation. Table 42 shows examples of using the **retrieve** command. See "Retrieve" on page 423 for additional examples, and detailed information about the **retrieve** command.

Table 42. Command line examples of retrieving archives

Task	Command	Considerations
Retrieve the /home/jones/h1.doc file to its original directory.	dsmc retrieve /home/jones/h1.doc	If you do not specify a destination, the files are retrieved to their original location.
Retrieve the /home/jones/h1.doc file under a new name and directory.	dsmc retrieve /home/jones/h1.doc /home/smith/h2.doc	None
Retrieve all files from the /home/jones directory that end with the characters .bak to the /home/smith directory.	dsmc retrieve "/home/jones/*.bak" /home/smith/	None.
Use the *pick* option to display a list of archives from which you can select files to retrieve.	dsmc retrieve "/home/jones/*" -pick	See "Pick" on page 267 for more information about the *pick* option.
Retrieve a list of files specified in the retrievelist.txt file to their original directory.	dsmc retrieve -filelist=/home/dir2/retrievelist.txt	See "Filelist" on page 212 for more information about retrieving a list of files.

Understanding how your archives are managed

As with backing up files, Tivoli Storage Manager checks the *include* options in your include-exclude options list to determine which management class to assign to your archived files. If you do not specifically assign a management class to a file with an *include* option, Tivoli Storage Manager assigns the file the default management class. Tivoli Storage Manager can only archive a file if the selected management class contains an archive copy group.

You can override the default management class by using the *archmc* option, or by selecting the management class from the **Options** menu in the GUI.

For information on the various management class attributes used to manage your archives, see "Displaying information about management classes and copy groups" on page 137. See "Assigning a management class to files" on page 141 for information about using the include-exclude options list.

Chapter 7. Automating tasks

This chapter applies to the Authorized User only. Root authorization is only required when updating the /etc/inittab and /etc/rc files.

Your administrator can schedule Tivoli Storage Manager to perform tasks automatically. For example, you can automatically back up files at the end of each day or archive some of your files every Friday. This procedure, known as *central scheduling*, is a cooperative effort between the server and your client node. Your administrator associates clients with one or more schedules that are part of the policy domain maintained in the server database. The administrator defines central scheduling on the server and you start the client scheduler on your workstation. Once you start the client scheduler, further intervention is not necessary.

With client scheduling, you can also:
- Display information about available schedules.
- Display information about work that the schedule has completed.
- Modify scheduling options in the client system options file (dsm.sys). See "Scheduling options" on page 157 for more information.

Notes:

1. The schedule start time is based on the server's local time, not the workstation's.

2. Install the command line client and ensure the communication software is running before you start the client scheduler.

Specifying scheduling options

You can modify scheduling options in the client system options file (dsm.sys) or in the graphical user interface. However, if your administrator specifies a value for these options, that value overrides the value in your client.

For more information about scheduling options, changing the scheduling mode, specifying the TCP/IP address or port number, or running commands before or after a schedule, see "Scheduling options" on page 157.

Configuring the client scheduler

See the following sections for more information:
- "Configuring the client scheduler" on page 44
- "Setting the client scheduler process to run as a background task and start automatically at boot time" on page 439

for more information.

Starting the client scheduler

To start the client scheduler on your client node and connect to the server schedule, enter the following command:

```
dsmc schedule
```

If the current directory is not in your PATH environment variable, enter the following command:

```
./dsmc schedule
```

When you start the client scheduler, it runs continuously until you close the window, end the process, or log off your system.

To run the **schedule** command in the background and to keep the client scheduler running, even if you log off your system, enter the following:

```
nohup dsmc schedule 2> /dev/null &
```

If a Tivoli Storage Manager password is required for your workstation and you want to run the **schedule** command in the background, enter the password with the command.

Root User: To start the client scheduler automatically, ensure that the *passwordaccess* option is set to generate in your client system options file (dsm.sys), then follow the procedure below for your operating system:

- **For non-OS/390 UNIX**, add the following entry to the **/etc/inittab** file:

```
itsm::once:/usr/bin/dsmc sched > /dev/null 2>&1 # TSM scheduler
```

   Note: You must include the redirection to /dev/null in the command.

For OS/390 UNIX:

1. Create a shell script called /tivoli/tsm/client/ba/bin/rundsmc which contains the following entries:

```
cd /usr/lpp/Tivoli/tsm/client/ba/bin
sleep 60
./dsmc schedule
```

   This prevents the creation of two jobs with the same name and enables automatic shutdown. You might need to customize the time for your system.

2. Add the following entries in the /etc/rc file to set environment variables to retrieve the *servername* and *nodename* options from dsm.sys and to start the client scheduler, as follows:

```
# Set environment variables to retrieve the servername and
# nodename options from dsm.sys.
export DSM_DIR=/tivoli/tsm/client/ba/bin
export DSM_CONFIG=/tivoli/tsm/client/ba/bin/dsm.opt
# Start the TSM Client scheduler and redirect outputs to
# schedule.out instead of the /etc/log file.
_BPX_JOBNAME='ADSMCLNT' /tivoli/tsm/client/ba/bin/rundsmc
1>/tivoli/tsm/client/ba/bin/schedule.out 2>&1 &
```

   Note: Enter the _BPX_JOBNAME entry on a single line in the /etc/rc file.

The client scheduler can fail to initialize properly at IPL because TCP/IP is not fully initialized. You might need to customize the time for your system to compensate for this.

Tivoli Storage Manager does not recognize changes made to the dsm.opt or the dsm.sys file while the client scheduler is running. If you make changes to these files while the client scheduler is running, and you want to use the new values immediately, stop the client scheduler and restart it. For example, if you change the *inclexcl* option in your dsm.sys file to point to a different include-exclude options file, you must stop the client scheduler and restart it before Tivoli Storage Manager uses the new file.

To manually stop the client scheduler, enter the **kill** command if it is running in the background, or press **q** or **Ctrl+C** if it is running in the foreground. To restart the client scheduler, enter the **schedule** command again.

Tape prompting does not occur during a scheduled event regardless of the *tapeprompt* option setting in your options file.

Use the Client Acceptor daemon to manage the client scheduler. See "Configuring the client scheduler" on page 44 for more information.

Enabling firewall support

See "Configuring Tivoli Storage Manager client/server communication across a firewall" on page 45 for information about enabling the backup-archive client, command line admin client, and the scheduler to run outside a firewall.

Return codes from the command line interface

The backup-archive command line interface and the scheduler exit with return codes that accurately reflect the success or failure of the client operation. Users who already have scripts, batch files, or other scheduling or automation facilities that interpret the return code from the command line interface may need to make changes in order to accommodate these new return codes.

In general, the return code is related to the highest severity message during the client operation.
- If the highest severity message is informational (ANSnnnnI), then the return code will be 0.
- If the highest severity message is a warning (ANSnnnnW), then the return code will be 8.
- If the highest severity message is an error (ANSnnnnE), then the return code will be 12.

The exception to the above rules are warning or error messages that individual files could not be processed. For such a skipped file, the return code will be 4. For cases where the return code is not 0, you can examine the dsmerror.log file (and, for scheduled events, the dsmsched.log file).

For a description of the return codes and their meanings, see Table 43

Table 43. Return codes and their meanings

Code	Explanation
0	All operations completed successfully.
4	The operation completed successfully, but some files were not processed. There were no other errors or warnings. This return code is very common. Files are not processed for various reasons. The most common reasons are: • The file is in an exclude list. • The file was in use by another application and could not be accessed by the client. • The file changed during the operation to an extent prohibited by the copy serialization attribute. See "Copy serialization" on page 139.
8	The operation completed with at least one warning message. For scheduled events, the status will be *Completed*. Review dsmerror.log (and dsmsched.log for scheduled events) to determine what warning messages were issued and to assess their impact on the operation.

Table 43. Return codes and their meanings (continued)

Code	Explanation
12	The operation completed with at least one error message (except for error messages for skipped files). For scheduled events, the status will be *Failed.* Review the dsmerror.log file (and dsmsched.log file for scheduled events) to determine what error messages were issued and to assess their impact on the operation. As a general rule, this return code means that the error was severe enough to prevent the successful completion of the operation. For example, an error that prevents an entire file system from being processed yields return code 12. When a file is not found the operation yields return code 12.
other	For scheduled operations where the scheduled action is COMMAND, the return code will be the return code from the command that was executed. If the return code is 0, the status of the scheduled operation will be *Completed.* If the return code is nonzero, then the status will be *Failed.*
	Some commands may issue a nonzero return code to indicate success. For these commands, you can avoid a *Failed* status by *wrapping* the command in a script that invokes the command, interprets the results, and exits with return code 0 if the command was successful (the script should exit with a nonzero return code if the command failed). Then ask your Tivoli Storage Manager server administrator modify the schedule definition to invoke your script instead of the command.

The return code for a client macro will be the highest return code issued among the individual commands that comprise the macro. For example, suppose a macro consists of these commands:

```
selective "/home/devel/*" -subdir=yes
incremental "/home/devel/TestDriver/*" -subdir=yes
archive "/home/plan/proj1/*" -subdir=yes
```

If the first command completes with return code 0; the second command completes with return code 8; and the third command completes with return code 4, the return code for the macro will be 8.

Also see "Handling return codes from preschedulecmd and postschedulecmd Scripts" on page 438.

Displaying information about scheduled work

To view schedules that are defined for your client node, enter:

```
dsmc query schedule
```

Tivoli Storage Manager displays detailed information about all scheduled work for your client node. The figure below displays sample **query schedule** output.

```
   Schedule Name: DAILY_INC
     Description: Daily System-wide backup
          Action: Incremental
         Options: QUIET
         Objects:
        Priority: 1
  Next Execution: 30 minutes
        Duration: 4 Hours
          Period: 1 Day
     Day of Week: Any
          Expire: Never

   Schedule Name: WEEKLY_INC
     Description: Weekly backup for project files
          Action: Incremental
         Options: QUIET
         Objects: /proj
        Priority: 1
  Next Execution: 60 minutes
        Duration: 8 Hours
          Period: 7 Days
     Day of Week: Friday
          Expire: Never
```

Figure 1. Sample query schedule output

The schedule name, **DAILY_INC**, starts a daily incremental backup. The next
incremental backup will start in 30 minutes. Because no objects are listed, Tivoli
Storage Manager runs the incremental backup on your default domain. The
schedule has no expiration date.

The schedule name, **WEEKLY_INC**, starts a weekly incremental backup in the
/proj file system.

Displaying information about completed work

When you run the **schedule** command in the foreground, your screen displays
output from the scheduled commands. Output is also directed to the dsmsched.log
file in the current directory unless you change the path and file name using the
schedlogname option.

When you run the **schedule** command in the background, output from scheduled
commands is directed to the dsmsched.log file in the current directory, or to the
path and file name that you specified. Please note that the dsmsched.log cannot be
a symbolic link.

After scheduled work is performed, check the schedule log to verify that all work
completed successfully.

When a scheduled command is processed the schedule log contains the following
entry:

    Scheduled event *eventname* completed successfully

The client indicates whether Tivoli Storage Manager successfully issued the
scheduled command associated with the *eventname*. No attempt is made to
determine the success or failure of the command. You can assess the status of the

command by evaluating the return code from the scheduled command in the schedule log. The schedule log entry for the command's return code is prefaced with the following text:

```
Finished command. Return code is:
```

The schedule log continues to grow unless you prune it using the *schedlogretention* option. See "Specifying scheduling options" on page 129 for more information.

Scheduling options for commands

The scheduler executes commands under a user ID of 0 (root); however, some commands might need to be executed under a user ID different than 0. In this case, your Tivoli Storage Manager administrator can define schedules for commands that will be executed under a user ID different from the scheduler user ID using the *schedcmduser* server option.

The *schedcmduser* option specifies the name of a valid user on the system where a scheduled command is executed. This option can only be defined by the Tivoli Storage Manager server administrator. If this option is specified, the command is executed with the authorization of the specified user. Otherwise, it is executed with the scheduler authorization.

```
►►──SCHEDCMDUser──user_name──────────────────────────────────────────►◄
```

user_name
> Specifies the name of a valid user on the system where a scheduled command is executed.

Enabling or disabling scheduled commands

You can use the *schedcmddisabled* option to disable the scheduling of commands by the server. Commands are scheduled by using the *action*=**command** option on the **define schedule** server command.

The *schedcmddisabled* option does not disable the *preschedulecmd* and *postschedulecmd* commands. However, you can specify *preschedulecmd* or *postschedulecmd* with a blank or a null string to disable the scheduling of these commands. See "Schedcmddisabled" on page 289 for more information.

Chapter 8. Understanding storage management policies

Storage management policies are rules your administrator defines in order to manage your backups and archives on the server. You can associate (or *bind*) your data to these policies; then when the data is backed up or archived, it is managed according to policy criteria. Policy criteria include a policy domain, a policy set, a copy group, and a management class.

Policies determine:
- Whether a file is eligible for backup or archive services.
- How many backup versions to keep.
- How long to keep inactive backup versions and archive copies.
- Where to place the copies in storage.
- For incremental backup, policies also determine:
  - How frequently a file can be backed up.
  - Whether a file must change before it is backed up again.

If you have the Tivoli Space Manager client installed, your administrator also defines rules that determine whether files are eligible for migration from your local file systems to storage.

This chapter explains:
- Policy criteria (policy domains, policy sets, copy groups, and management classes).
- How to display policies.
- How Tivoli Storage Manager associates your data with policies.

Using policy domains and policy sets

A *policy domain* is a group of clients with similar requirements for backing up and archiving data. Policy domains contain one or more policy sets. An administrator uses policy domains to manage a group of client nodes in a logical way. For example, a policy domain might include:
- A department, such as Accounting.
- A physical location, such as a particular building or floor.
- A local area network, such as all clients associated with a particular file server.

Tivoli Storage Manager includes a default policy domain named *Standard*. At first, your client node might be associated with the default policy domain. However, your administrator can define additional policy domains if there are groups of users with unique backup and archive requirements.

A *policy set* is a group of one or more management classes. Each policy domain can hold many policy sets. The administrator uses a policy set to implement different management classes based on business and user needs. Only one of these policy sets can be active at a time. This is called the *active policy set*. Each policy set contains a *default management class* and any number of additional management classes.

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Using management classes and copy groups

A *management class* is a collection of backup and archive copy groups that establishes and contains specific storage management requirements for backing up and archiving data. An administrator can establish separate management classes to meet the backup and archive requirements for different kinds of data, such as:
- System data that is critical for the business.
- Application data that changes frequently.
- Report data that Management reviews monthly.
- Legal information that must be retained indefinitely, requiring a large amount of disk space.

Note: If you have the Tivoli Space Manager client installed, it can also contain specific requirements for migrating files to storage.

Most of the work you do with storage management policies is with management classes. You must associate (or *bind*) each file and directory that you back up and each file that you archive with a management class:
- If you do not associate a file with a management class, Tivoli Storage Manager uses the default management class in the active policy set.
- For backup directories, you can specify a management class with an **include** statement or the **dirmc** option. If you do not specify a management class, Tivoli Storage Manager uses the management class in the active policy set specifying the longest retention period.
- For archive directories, you can specify a management class with an **include.archive** statement or the **archmc** option. If you do not specify a management class, the server assigns the default management class to the archived directory. If the default management class has no archive copy group, the server assigns the management class that currently has the archive copy group with the shortest retention time.

You can use **include** statements in your include-exclude list to associate files with management classes. See "Selecting a management class for files" on page 140 for more information. In your client system options file (dsm.sys), you can associate directories with a management class, using the **dirmc** option. See "Selecting a management class for directories" on page 142 for more information.

Within a management class, the specific backup and archive requirements are in *copy groups*. Copy groups define the specific storage management attributes that describe how the server manages backed up or archived data. Copy groups include both *backup copy groups* and *archive copy groups*. A management class can have one backup copy group, one archive copy group, both, or neither.

A *backup copy group* contains attributes that are used during the backup process to determine:
- Whether a file that has changed since the last backup is backed up again.
- How many days must elapse before a file is backed up again.
- How a file is processed during a backup if it is in use.

It also contains attributes to manage the backup versions of your files on the server. These attributes control:
- Where the server stores backup versions of your files and directories.
- How many backup versions the server keeps of your files and directories.
- How long the server keeps backup versions of your files and directories.
- How long the server keeps inactive backup versions.

- How long the last version of a file is kept.

An *archive copy group* contains attributes that control:
- Whether a file is archived if it is in use
- Where the server stores archived copies of your files
- How long the server keeps archived copies of your files

When the server is unable to rebind a file to an appropriate management class, the server uses one of two values to determine the number of days to retain the file. If it is a backup version, the server uses *backup retention grace period*. Archive copies are never rebound because each archive operation creates a different archive copy. Archive copies remain bound to the management class name specified when the user archived them. If the management class to which an archive copy is bound no longer exists or no longer contains an archive copy group, the server uses the default management class. If you later change or replace the default management class, the server uses the updated default management class to manage the archive copy. If the default management class does not contain an archive copy group, the server uses the *archive retention grace period* specified for the policy domain. For more information about grace periods, see "Using a retention grace period" on page 144.

Displaying information about management classes and copy groups

Before you select the management classes you want to use, click **View policy information** from the Utilities menu. The **Display policy information** window is displayed. You can then determine which management classes are available.

The **Display policy information** window provides the following information:
- The name of the default management class.
- The name of the policy domain to which the management class belongs.
- The policy set that is currently active.
- The date and time that this policy set became active.
- The number of backup versions which are maintained for files which still exist on your workstation.
- The number of backup versions which are maintained for files which have been deleted from your workstation.
- The number of days to keep inactive backup versions.
- The number of days to keep the last backup version.
- The management class name and a description.

You can also use the *detail* option on the **query mgmtclass** command to view the available management classes.

Table 44 shows the default values for the backup and archive copy groups in the standard management class. Each attribute is discussed in more detail immediately following the table.

Table 44. Default values in the standard management class

Attribute	Backup default	Archive default
Copy group name	Standard	Standard
Copy type	Backup	Archive
Copy frequency	0 days	CMD (Command)
Versions data exists	Two versions	Does not apply
Versions data deleted	One version	Does not apply

Table 44. Default values in the standard management class (continued)

Attribute	Backup default	Archive default
Retain extra versions	30 days	Does not apply
Retain only version	60 days	Does not apply
Copy serialization	Shared static	Shared static
Copy mode	Modified	Absolute
Copy destination	Backuppool	Archivepool
Retain versions	Does not apply	365 days

Copy group name

The name of the copy group. The default value for both backup and archive is *Standard*.

Copy type

The type of copy group. The value for backup is always *Backup*, and the value for archive is always *Archive*.

Copy frequency

Copy frequency is the minimum number of days that must elapse between successive incremental backups. Use this attribute during a full incremental backup.

Copy frequency works with the *mode* parameter. For example, if frequency is *zero (0)* and mode is *modified*, a file or directory is backed up *only if* it changed since the last incremental backup. If frequency is *zero (0)* and mode is *absolute*, a file is backed up every time you run an incremental backup against it. This attribute is not checked for selective backups.

For archive copy groups, copy frequency is always CMD (command). There is no restriction on how often you archive a file.

Versions data exists

The *Versions Data Exists* attribute specifies the maximum number of different backup versions retained for files and directories currently on your workstation. If you select a management class that permits more than one backup version, the most recent version is called the *active* version. All other versions are called *inactive* versions. If the maximum number of versions permitted is five, and you run a backup that creates a sixth version, the oldest version is deleted from server storage.

Versions data deleted

The *Versions Data Deleted* attribute specifies the maximum number of different backup versions retained for files and directories that you erased from your workstation. This parameter is ignored as long as the file or directory remains on your workstation.

If you erase the file or directory, the next time you run an incremental backup, the active backup version is changed to inactive and the oldest versions are erased that exceed the number specified by this parameter.

The expiration date for the remaining versions is based on the *retain extra versions* and *retain only version* parameters.

Retain extra versions

The *Retain Extra Versions* attribute specifies how many days all but the most recent backup version is retained. The most recent version is the active version, and active versions are never erased. If *Nolimit* is specified, then extra versions are kept until the number of backup versions exceeds the *versions data exists* or *versions data deleted* parameter settings. In this case, the oldest extra version is deleted immediately.

Retain only version

The *Retain Only Version* attribute specifies the number of days the last remaining inactive version of a file or directory is retained. If *Nolimit* is specified, the last version is retained indefinitely.

This parameter goes into effect during the next incremental backup after a file is deleted from the client machine. Any subsequent updates to this parameter will not affect files that are already inactive. For example: If this parameter is set to 10 days when a file is inactivated during an incremental backup, the file will be expired in 10 days.

Copy serialization

The *Copy Serialization* attribute determines whether a file can be in use during a backup or archive, and what to do if it is. The value for this attribute can be one of the following:

- **Static**. A file or directory must not be modified during a backup or archive. If the object is changed during a backup or archive attempt, it is not backed up or archived.

  Note: During an image backup, the static copy serialization value is no longer controlled by the server management class, but is instead controlled directly from the client, using the *imagetype* option. See "Imagetype" on page 227 for more information.

- **Shared static**. A file or directory must not be modified during backup or archive. Tivoli Storage Manager attempts to perform a backup or archive as many as four additional times, depending on the value specified on the *changingretries* option in your client system options (dsm.sys) file. If the object is changed during every backup or archive attempt, it is not backed up or archived.

- **Dynamic**. A file or directory is backed up or archived on the first attempt regardless of whether it changes during a backup or archive.

  Note: During an image backup, the dynamic copy serialization value is no longer controlled by the server management class, but is instead controlled directly from the client, using the *imagetype* option. See "Imagetype" on page 227 for more information.

- **Shared dynamic**. A file or directory is backed up or archived regardless of whether it changes during a backup or archive. Tivoli Storage Manager attempts to perform a back up or archive as many as four additional times, depending on the value specified on the *changingretries* option in your client system options file without the file changing during the attempt. The file is backed up or archived on the last try even if it has changed.

> **Attention:**   Be careful when you select a management class containing a copy group that specifies shared dynamic or dynamic for serialization backup. If you select a management class that permits a file to be backed up or archived while it is in use, the backup version or archived copy stored on the server might be a fuzzy copy. A *fuzzy copy* is a backup version or archived copy that does not accurately reflect what is currently in the file. It might contain some, but not all, of the changes. If that is not acceptable, select a management class that creates a backup version or archive copy only if the file does not change during a backup or archive.
>
> If you restore or retrieve a file that contains a fuzzy copy, the file might not be usable. You should not use dynamic or shared dymamic serialization to back up files, unless you are absolutely certain that a restore of a fuzzy copy will be usable.

Copy mode

The *Copy Mode* attribute determines whether a file or directory is considered for incremental backup regardless of whether it changed or not since the last backup. Tivoli Storage Manager does not check the mode for selective backups. The value for this parameter can be one of the following:

- **Modified.** The file is considered for incremental backup *only if* it has changed since the last backup. A file is considered changed if any of the following are true:
  – The date or time of the last modification is different.
  – The file size is different.
  – The file attributes, with the exception of archive, are different. However, if only the file meta-data changes (such as access permissions), but the file data does not change, Tivoli Storage Manager may back up only the meta-data.
  – The file owner is different.
  – The file permissions are different.
- **Absolute.** The file is considered for incremental backup regardless of whether it changed since the last backup. For archive copy groups, the mode is always *absolute*, indicating that a file is archived regardless of whether it changed since the last archive request.

Copy destination

Names the destination where backups or archives are stored. The destination can be either a storage pool of disk devices or a storage pool of devices that support removable media, such as tape.

Retain versions

Specifies the number of days an archived file remains in storage. When the specified number of days elapse for an archived copy of a file, it is deleted from server storage.

Selecting a management class for files

If the default management class meets the backup and archive requirements for all the files on your workstation, it is not necessary to take any action to associate your files with that management class. This is done automatically when you back up or archive your files.

When selecting a different management class for your files, consider these questions:

- Does the management class contain a backup copy group?

  If you attempt to back up a file associated with a management class that does not contain a backup copy group, the file is not backed up.
- Does the management class contain an archive copy group?

  You cannot archive a file associated with a management class that does not contain an archive copy group.
- Does the backup copy group contain attributes that back up your files often enough?

  Mode and frequency work together to control how often a file is backed up when you use incremental backup. Tivoli Storage Manager does not check those attributes for selective backup.
- Do the copy groups specify either static or shared static for serialization?

  If serialization is shared dynamic or dynamic, you might get fuzzy backups or archive copies. Verify that this is acceptable. For example, you might want to use shared dynamic or dynamic serialization for a file to which log records are continuously added. If you used static or shared static serialization, the file might never back up because it is constantly in use. With shared dynamic or dynamic serialization, the file is backed up, but the backup version of the file might contain a truncated message. Do not use shared dynamic or dynamic serialization for a file if it is very important that the backup version or archive copy contain all changes.
- Does the backup copy group specify an adequate number of backup versions to keep, along with an adequate length of time to keep them?
- Does the archive copy group specify an adequate length of time to keep archived copies of files?

Assigning a management class to files

A management class defines when your files are included in a backup, how long they are kept on the server, and how many versions of the file the server should keep. The server administrator selects a default management class. You can specify your own management class to override the default management class.

To assign a management class other than the default to directories, use the *dirmc* option in your client system options file (dsm.sys). See "Dirmc" on page 192 for more information.

You can assign a management class for a file or file group by using an **include** statement in your client systems options (dsm.sys) file or the include-exclude file specified by the *inclexcl* option. Management class names are not case-sensitive. For example, to associate all the files in the `costs` directory with a management class named **budget**, enter:

```
include /home/jones/costs/* budget
```

To specify a management class named **managall** to use for all files to which you do not explicitly assign a management class, enter:

```
include * managall
```

The example below demonstrates how to use a management class:

```
exclude /.../*.sno
include /home/winter/.../*.ice     mcweekly
include /home/winter/december/*.ice mcdaily
include /home/winter/january/*.ice  mcmonthly
include /home/winter/winter/white.sno
```

Processing follows these steps:

1. The file named white.sno is backed up following bottom-up processing rules. Because you did not specify a management class, the file is assigned to the default management class.
2. Any file with an extension of `ice` in the /home/winter/january directory is assigned to the management class, **mcmonthly**.
3. Any file with an extension of `ice` in the /home/winter/december directory is assigned to the management class, **mcdaily**.
4. Any other files with an extension of `ice` in any directory under /home/winter are assigned to the management class, **mcweekly**.
5. Any file with an extension of `sno` (except /home/winter/winter/white.sno) in any directory is excluded from backup.

To specify your own default management class for files that are not explicitly included, specify:

```
include * mgmt_class_name
```

as the first include or exclude option defined. See "Include options" on page 231 for more information about the **include** option.

When you archive a file using the graphical user interface, you can select a different management class to override the management class assigned to the file.

Overriding the management class for archived files

When you archive a file, you can override the assigned management class using the graphical user interface (GUI), or by using the **archmc** option on the **archive** command. Overriding the management class using the GUI is equivalent to using the **archmc** option on the **archive** command. To use the GUI, press the **Options** button on the archive tree to override the management class and select a different management class. For example, to associate the file, /home/jones/budget.jan, with the management class **ret2yrs**, you would enter:

```
dsmc archive –archmc=ret2yrs /home/jones/budget.jan
```

Note: Do not use management classes that contain an attribute of *retention initiation = event*. Otherwise, the archive will fail.

Selecting a management class for directories

If the management class in your active policy set containing the longest retention period meets your backup requirements for directories, it is not necessary to take any action to associate directories with that management class. Tivoli Storage Manager does it automatically when it backs up your directories.

If the default management class does not meet your requirements, select a management class with an adequate retention period specified on the *retain only version* parameter. You should keep directories at least as long as you keep the files associated with those directories.

For backup directories, you can assign a management class with an **include** statement, the **dirmc** option, or through the Tivoli Storage Manager GUI. If you do not specify a management class, Tivoli Storage Manager uses the management class in the active policy set specifying the longest retention period. See "Include options" on page 231 and "Dirmc" on page 192 for more information.

For archive directories, you can specify a management class with an *include.archive* statement, the *archmc* option, or through the Tivoli Storage Manager GUI. If you do not specify a management class, the server assigns the default management class to the archived directory. If the default management class has no archive copy group, the server assigns the management class that currently has the archive copy group with the shortest retention time. See "Include options" on page 231 and "Archmc" on page 169 for more information about the *dirmc* option.

Note: During expiration processing on Tivoli Storage Manager server, if an archived directory is eligible for expiration, the server checks if any existing archived files require the archived directory to remain. If so, the archived directory is not expired and the Tivoli Storage Manager client updates the insert date on archived directory to ensure that the directory is not expired before the files under it.

Binding and rebinding management classes to files

Binding associates a file with a management class. When you back up a file for the first time, Tivoli Storage Manager binds it to either the default management class or the management class specified in your include-exclude list. In later full incremental backups of the same file, if you change the management class, both active and inactive versions are bound again to the new management class. However, with selective backup and incremental-by-date backups, the new backups are bound to the new management class, but previous backup versions remain bound to the original management class.

If the backup copy group for the management class specifies keeping multiple backup versions of the file, and you request multiple backups, the server always has one active backup version (the current version) and one or more inactive backup versions of the file. All backup versions of a file are bound to the same management class and are managed based on the attributes in the backup copy group.

When you archive a file for the first time, Tivoli Storage Manager binds it to the default management class, to the management class specified in your include-exclude list, or to a management class you specify when modifying your archive options during an archive.

Archived files are never rebound to a different management class. If you change the management class for a file using the an *include.archive* statement, the *archmc* option, or through the Tivoli Storage Manager GUI, any previous copies of the file that you archived remain bound to the management class specified when you archived them. expire before any file beneath it.

Rebinding backup versions of files

Backups of files are bound again to a different management class in the following conditions. In each condition, the files (active and inactive) are not bound again until the next backup.

- You specify a different management class in an Include statement to change the management class for the file. The backups are managed based on the old management class until you run another backup.

- Your administrator deletes the management class from your active policy set. The default management class is used to manage the backup versions when you back up the file again.
- Your administrator assigns your client node to a different policy domain and the active policy set in that domain does not have a management class with the same name. The default management class for the new policy domain is used to manage the backup versions.

Using a retention grace period

Tivoli Storage Manager also provides a *backup retention grace period* and an *archive retention grace period* to help protect your backup and archive data when it is unable to rebind a file to an appropriate management class. The backup retention grace period is used when:

- You change the management class for a file, but neither the default management class nor the new management class contain a backup copy group.
- The management class to which a file is bound no longer exists, and the default management class does not contain a backup copy group.

The backup retention grace period, defined in your policy domain, starts when you run an incremental backup. The default is 30 days. However, your administrator can lengthen or shorten this period.

When Tivoli Storage Manager manages a file using the backup retention grace period, it does not create any new backup versions of the file. All existing backup versions of the file expire 30 days (or the number of days specified in your policy domain) from the day they are marked inactive.

Archive copies are never rebound because each archive operation creates a different archive copy. Archive copies remain bound to the management class name specified when the user archived them. If the management class to which an archive copy is bound no longer exists or no longer contains an archive copy group, the server uses the default management class. If you later change or replace the default management class, the server uses the updated default management class to manage the archive copy. If the default management class does not contain an archive copy group, the server uses the archive retention grace period specified for the policy domain.

Chapter 9. Using processing options

You can use defaults for processing options or you can tailor the processing options to meet your specific needs. This chapter:
- Provides an overview of processing options.
- Includes an options reference section that provides detailed information about each option.

Overview of processing options

Tivoli Storage Manager uses *processing options* that you specify in your client system options file (dsm.sys) or client user options file (dsm.opt) or on the command line to control communications, backup-archive processing, and other types of processing.

This section provides an overview of the following types of options that you can use:
- Communication options
- Server and Node options
- Backup and archive processing options
- Restore and retrieve processing options
- Scheduling options
- Format and language options
- Command processing options
- Authorization options
- Error processing options
- Transaction processing option
- Web client options
- Diagnostics options

See Chapter 2, "Configuring Tivoli Storage Manager," on page 33 for information on how to create and modify your client system options file (dsm.sys) or client user options file (dsm.opt) file.

Tivoli Storage Manager also includes a group of client command options that you can enter *only* on the command line with specific commands. You can override some of the options in your options file by entering them with appropriate backup-archive commands. For a complete list of command line options, a description, and where to go in this book for more information, see Table 58 on page 162.

Communication options

You use communication options to specify how your client node communicates with a Tivoli Storage Manager server.

For UNIX use one of the following communication protocols:
- TCP/IP (all UNIX clients)
- Shared Memory (AIX, HP-UX, and Solaris only)

Use the ***commmethod*** option to specify the communication protocol. For more information, see "Commmethod" on page 177.

You can also use the *lanfreecommmethod* option to specify the communication protocol in a SAN environment. See "Lanfreecommmethod" on page 237 for more information.

Ask your Tivoli Storage Manager administrator for assistance in setting your communication options.

TCP/IP options

To use the TCP/IP communication protocol, you must include the *tcpserveraddress* option in your client system options file (dsm.sys). The other TCP/IP options have default values that you can modify if you want to change the default value.

If you plan to back up an NFS system, see "Nfstimeout" on page 255.

Table 45. TCP/IP options

Option	Description	Page
httpport	Specifies a TCP/IP port address for the Tivoli Storage Manager Web client.	224
lanfreetcpport	Specifies the TCP/IP port number where the Tivoli Storage Manager storage agent is listening.	240
tcpbuffsize	Specifies the size, in kilobytes, of the Tivoli Storage Manager internal TCP/IP communication buffer.	312
tcpnodelay	Specifies whether to send small transactions to the server, without buffering them first. This option is for AIX clients *only*.	315
tcpadminport	Specifies a separate TCP/IP port number on which the server is waiting for requests for administrative client sessions, allowing secure administrative sessions within a private network.	311
tcpport	Specifies the TCP/IP port address for a Tivoli Storage Manager server.	316
tcpserveraddress	Specifies the TCP/IP address for a Tivoli Storage Manager server.	317
tcpwindowsize	Specifies the size, in kilobytes, of the TCP/IP sliding window for your client node.	318
webports	Enables the use of the Web client outside a firewall by specifying the TCP/IP port number used by the Client Acceptor daemon and the Web Client Agent service for communications with the Web GUI.	342

Shared Memory options

You must install TCP/IP on your workstation to use the Shared Memory communication method.

Table 46. Shared Memory communication options

Option	Description	Page
shmport	Specifies the TCP/IP port address on which the Tivoli Storage Manager server listens to establish a Shared Memory connection.	301

Table 46. Shared Memory communication options (continued)

Option	Description	Page
lanfreeshmport	Specifies the Shared Memory port number where the Tivoli Storage Manager storage agent is listening. Use this option when you specify *lanfreecommmethod*=*SHAREdmem* for communication between the Tivoli Storage Manager client and storage agent when processing between the client and the SAN-attached storage device.	239

Server and Node options

Authorized User

Use the following options to specify the server to contact for backup-archive services, and the client node for which to request backup-archive services.

Server options

Use the *servername* option in your client system options file (dsm.sys) to begin a group of options (stanza) used to connect to a Tivoli Storage Manager server. You can set up multiple stanzas in the dsm.sys file to connect to different servers. Each stanza must contain all options required to establish communication with a server. The stanza can also contain other options for backup-archive operations.

If your client system options file contains only one stanza - Your client node contacts the server you specify in that stanza for all services.

If your client system options file contains more than one stanza - You can specify a default server with the *defaultserver* option. If you do not specify a default server, by default Tivoli Storage Manager contacts the server you specify in the first stanza of your dsm.sys file.

Place the *defaultserver* option at the beginning of your dsm.sys file before any server stanzas. See "Defaultserver" on page 187 for more information.

Use the *servername* option in the client user options file (dsm.opt) or on the command line to specify a server to contact for backup-archive services. This overrides the default server specified in your client system options file (dsm.sys).

Note: You cannot override the migration server specified in the client system options file.

Figure 2 on page 148 shows a sample client system options file (dsm.sys).

```
DEFAULTServer               server2

SErvername    server1
  NODename                  node1
  COMMMethod                TCPip
  TCPPort                   1500
  TCPServeraddress          almvmd.almaden.ibm.com
  PASSWORDAccess            generate
  MAILprog                  /usr/bin/xsend root
  GRoups                    system adsm
  USERs                     ashton stewart kaitlin
  INCLExcl                  /adm/adsm/backup1.excl

SErvername    server2
  COMMMethod                SHAREdmem
  shmport                   1520
  PASSWORDAccess            prompt
  GRoups                    system adsm
  USERs                     danielle derek brant
  INCLExcl                  /adm/adsm/backup2.excl
```

Figure 2. Sample client system options file

Node options

You may specify the following node options in your client system options file
(dsm.sys):

Table 47. Server and Node Options

Option	Description	Page
defaultserver	The name of the Tivoli Storage Manager server to contact for backup-archive services by default if more than one server is defined in the client system options file (dsm.sys). Also specifies the server to contact for space management services if you have the HSM client installed and do not specify a server with the *migrateserver* option. See *IBM Tivoli Storage Manager for Space Management for UNIX User's Guide*, GC32-0794 for more information.	187
clusternode	Specifies whether Tivoli Storage Manager participates in a High Availability Cluster Multi Processing (HACMP) environment.	174
nasnodename	Specifies the node name for the NAS file server when processing NAS file systems.	254
nodename	Use the *nodename* option in your client system options file dsm.sys to identify your workstation to the server to establish communications.	257
servername	In the client system options file (dsm.sys), this option specifies the name of a server. In the client user options file (dsm.opt), this option specifies the Tivoli Storage Manager server to contact for services.	297
virtualnodename	The *virtualnodename* option specifies the node name of your workstation when you want to restore or retrieve files to a different workstation.	334

Backup and archive processing options

You can use the following options to control some aspects of backup and archive processing.

Table 48. Backup and archive processing options

Option	Description	Page
archmc	Use the *archmc* option with the **archive** command to specify the available management class for your policy domain to which you want to bind your archived files.	169
archsymlinkasfile	Specifies whether you want Tivoli Storage Manager to follow a symbolic link and archive the file or directory to which it points, or archive the symbolic link only.	170
automount	Use this option with the *domain* option to specify all automounted file systems the Tivoli Storage Manager client tries to mount at the following points in time: • When Tivoli Storage Manager client starts • When the back up is started • When the Tivoli Storage Manager client has reached an automounted file system during backup	171
changingretries	Specifies the number of retries when attempting to back up or archive a file that is in use.	172
class	Specifies whether to display a list of NAS, client, or WebSphere Application Server (WAS) objects during a **query backup**, **query filespace**, or **delete filespace** operation.	173
compressalways	The *compressalways* option specifies whether to continue compressing an object if it grows during compression. Use this option with the *compression* option.	180
compression	The *compression* option compresses files *before* you send them to the server. Compressing your files reduces data storage for backup versions and archive copies of your files. **Note:** The *compression* option also applies to migrated files if you install the Tivoli Storage Manager HSM client on your workstation.	181
deletefiles	Use the *deletefiles* option with the **archive** command to delete files from your workstation after you archive them. You can also use this option with the **restore image** command and the *incremental* option to delete files from the restored image if they were deleted after the image was created.	188
description	The *description* option assigns or specifies a description for files when performing archive, delete, retrieve, or query archive operations.	189
detail	Use the *detail* option to display management class, file space, backup, and archive information depending on the command with which it is used.	191

Table 48. Backup and archive processing options (continued)

Option	Description	Page
dirmc	Specifies the management class to use for directories. If you do not specify this option, the client uses the management class in the active policy set of your policy domain with the longest retention period.	192
dirsonly	Backs up, restores, archives, retrieves, or queries directories *only*.	193
domain	Specifies the file systems to include in your default client domain for an incremental backup.	194
domain.image	Specifies the mounted file systems and raw logical volumes that you want to include in your client domain for an image backup. This option is for AIX, HP-UX, Linux86, Linux IA64, Linux pSeries, Linux iSeries, and Solaris *only*.	198
domain.nas	Specifies the volumes to include in your default domain for NAS image backups. This option is for AIX and Solaris clients *only*.	199
enablelanfree	Specifies whether to enable an available LAN-free path to a storage area network (SAN) attached storage device.	202
exclude *exclude.backup* *exclude.file* *exclude.file.backup*	*These options are equivalent.* Use these options to exclude a file or group of files from backup services and space management services (if the HSM client is installed). The *exclude.backup* option only excludes files from normal backup, but not from HSM.	208
exclude.archive	Excludes a file or a group of files that match the pattern from archive services *only*.	208
exclude.attribute.symlink	Excludes a file or a group of files that are symbolic links from backup processing only.	208
exclude.compression	Excludes files from compression processing if you set the *compression* option to *yes*. This option applies to backups and archives.	208
exclude.dir	Excludes a directory, its files, and all its subdirectories and their files from backup processing.	208
exclude.encrypt	Excludes specified files from encryption processing.	208
exclude.fs	Excludes file spaces matching a pattern. This option is valid for all UNIX clients.	208
exclude.fs.nas	Excludes file systems on the NAS file server from an image backup when used with the **backup nas** command. This option is for AIX and Solaris clients *only*.	208
exclude.image	Excludes mounted file systems and raw logical volumes that match the pattern from image processing. This option is valid for AIX, HP-UX, Solaris, Linux86, Linux IA64, Linux pSeries, and Linux iSeries *only*.	208

Table 48. Backup and archive processing options (continued)

Option	Description	Page
filelist	Specifies a list of files to be processed for the command. Tivoli Storage Manager opens the designated filelist and processes the files listed within according to the command.	212
filesonly	Backs up, restores, retrieves, or queries files *only*.	215
groupname	Use this option with the **backup group** command to specify the fully qualified name of the group leader for a group.	221
guitreeviewafterbackup	Specifies whether the client is returned to the Backup, Restore, Archive, or Retrieve window after a successful operation completes.	223
imagetype	Use the *imagetype* option with the **backup image** command or the *include.image* option to specify the type of image backup you want to perform. This option is valid for AIX, Solaris, HP-UX, Linux86, Linux IA64, Linux pSeries, and Linux iSeries clients *only*.	227
inclexcl	Specifies the path and file name of an include-exclude options file.	230
include *include.backup* *include.file*	*These options are equivalent.* Use these options to include files or assign management classes for backup processing.	231
include.archive	Includes files or assigns management classes for archive processing.	231
include.attribute.symlink	Includes a file or a group of files that are symbolic links within broad group of excluded files for backup processing only.	231
include.compression	Includes files for compression processing if you set the *compression* option to *yes*. This option applies to backups and archives.	231
include.encrypt	Includes the specified files for encryption processing. By default, Tivoli Storage Manager does not perform encryption processing.	231
include.fs.nas	Use the *include.fs.nas* option to bind a management class to Network Attached Storage (NAS) file systems. You can also specify whether Tivoli Storage Manager saves Table of Contents (TOC) information during a NAS file system image backup, using the *toc* option with the *include.fs.nas* option in your client system options file (dsm.sys). See "Toc" on page 321 for more information. This option is valid for AIX and Solaris clients *only*.	231
include.image	Includes a file system or logical volume or assigns a management class when used with the **backup image** command. The **backup image** command ignores all other include options. This option is valid for AIX, HP-UX, Solaris, Linux86, Linux IA64, Linux pSeries, and Linux iSeries *only*.	231
incrbydate	Use with the **incremental** command to request an incremental backup by date.	235

Table 48. Backup and archive processing options (continued)

Option	Description	Page
incremental	Use with the **restore image** command to ensure that any changes that were made to the base image are also applied to the restored image. This option is valid for AIX, HP-UX, Linux86, Linux IA64, Linux pSeries, Linux iSeries, and Solaris *only*.	236
memoryefficientbackup	Specifies a memory-saving backup algorithm for incremental backups when used with the **incremental** command.	250
mode	Use the *mode* option with these commands, as follows: **backup image** To specify whether to perform a selective or incremental image backup of client file systems. **backup nas** To specify whether to perform a full or differential image backup of NAS file systems. **backup was** To specify whether to perform a full or differential backup of the WebSphere Application Server (WAS) Network Deployment Manager (contains setup, application files, and configuration information) or the Application Server to the Tivoli Storage Manager server. **backup group** To specify whether to perform a full or differential group backup containing a list of files from one or more file space origins.	251
monitor	Specifies whether you want to monitor an image backup of file systems belonging to a Network Attached Storage (NAS) file server.	253
noprompt	Suppresses the confirmation prompt that normally appears before you delete an archived file after using the *deletefiles* option with the *archive* command, or when performing an image restore operation.	259
optfile	Specifies the client user options file you want to use when you start a Tivoli Storage Manager session.	262
preservelastaccessdate	Use this option during a backup or archive operation to specify whether to reset the last access date of any specified files to their original value following a backup or archive operation. By default, the Tivoli Storage Manager client *will not* reset the last access date of any backed up or archived files to their original value prior to the backup or archive operation.	274

Table 48. Backup and archive processing options (continued)

Option	Description	Page
removeoperandlimit	Specifies that Tivoli Storage Manager removes the 20-operand limit for Unix-family platforms. If you specify the *removeoperandlimit* option with the **incremental**, **selective**, or **archive** commands, the 20-operand limit is not enforced and is restricted only by available resources or other operating system limits.	281
snapshotcachesize	During a snapshot image backup, use this option to specify an appropriate snapshot size so that all old data blocks can be stored. A snapshot size of 100 percent will ensure a valid snapshot. This option is valid for Linux86 and Linux IA64 clients *only*.	303
snapshotroot	Use the *snapshotroot* option with the **incremental**, **selective**, or **archive** commands in conjunction with a third-party application that provides a snapshot of a logical volume, to associate the data on the local snapshot with the real file space data that is stored on the Tivoli Storage Manager server. This option is valid for all UNIX clients.	304
subdir	Specifies whether to include subdirectories of a named directory.	307
tapeprompt	Specifies whether you want Tivoli Storage Manager to wait for a tape to mount if it is required for a backup, archive, restore, or retrieve process, or to be prompted for a choice.	309
toc	Use the *toc* option with the **backup nas** command or the *include.fs.nas* option to specify whether Tivoli Storage Manager saves Table of Contents (TOC) information for each file system backup. If you save TOC information, you can use the **query toc** server command to determine the contents of a file system backup in conjunction with the **restore node** server command to restore individual files or directory trees. You can also use the Tivoli Storage Manager Web client to examine the entire file system tree and select files and directories to restore.	321
type	Use the *type* option with the **query node** command to specify the type of node to query.	326
v2archive	Use the *v2archive* option with the **archive** command to archive only files to the server. Tivoli Storage Manager will not process directories that exist in the path of the source file specification.	328
virtualfsname	Use this option with the **backup group** command to specify the name of the container for the group on which you want to perform the operation.	331
virtualmountpoint	Defines a virtual mount point for a file system if you want to consider files for backup that begin with a specific directory within that file system.	332

Table 48. Backup and archive processing options (continued)

Option	Description	Page
wasnode	If WAS security is enabled, use the ***wasnode*** option with the **set waspassword** command to specify the node name when setting the user name and password for each installation of WAS on your machine.	339
wasexphome	To backup the WebSphere Application Server-Express, use the ***wasexphome*** option to specify the fully qualified installation path of the WebSphere Application Server-Express.	336
washome	Use the ***washome*** option in your client user options file (dsm.opt) to specify an override base install path for the Application Server	337
wasndhome	Use the ***wasndhome*** option in your client user options file (dsm.opt) to specify an override base install path for the Network Deployment Manager.	338
wastype	Use the ***wastype*** option with the **backup was** command to back up the WAS Network Deployment Manager or the Application Server. If WAS security is enabled, use the ***wastype*** option with the **set waspassword** command to specify the WAS Network Deployment Manager or Application Server when setting the user name and password for each installation of WAS on your machine.	340
wasuser	If WAS security is enabled, use the ***wasuser*** option with the **set waspassword** command to set the user name for each installation of WAS on your machine.	341

Restore and retrieve processing options

The following options relate to restore and retrieve processing.

Table 49. Restore and retrieve processing options

Option	Description	Page
dirsonly	Backs up, restores, archives, retrieves, or queries directories *only*.	193
filelist	Specifies a list of files to be processed for the command. Tivoli Storage Manager opens the designated filelist and processes the files listed within according to the command.	212
filesonly	Backs up, restores, retrieves, or queries files *only*.	215
followsymbolic	Specifies whether you want to restore files to symbolic links or use a symbolic link as a virtual mount point.	216
fromdate	Use the ***fromdate*** option with the ***fromtime*** option to specify a date and time from which you want to search for backups or archives during a restore, retrieve, or query operation.	217

Table 49. Restore and retrieve processing options (continued)

Option	Description	Page
fromnode	Permits one node to perform commands for another node. A user on another node must use the **set access** command to permit you to query, restore, or retrieve files or images for the other node.	218
fromowner	Displays file spaces for an alternate owner. Also specifies an alternate owner from which to restore or retrieve files.	219
fromtime	Use the *fromtime* option with the *fromdate* option to specify a beginning time from which you want to search for backups or archives during a restore, retrieve or query operation.	220
guitreeviewafterbackup	Specifies whether the client is returned to the Backup, Restore, Archive, or Retrieve window after a successful operation completes.	223
ifnewer	Replaces an existing file with the latest backup version only if the backup version is newer than the existing file.	225
imagetofile	Use the *imagetofile* option with the **restore image** command to specify that you want to restore the source image to a file. You may need to restore the image to a file in the event of bad sectors present on the target volume, or if you want to do some manipulations with the image data. This option is valid for AIX, HP-UX, Linux86, Linux IA64, Linux pSeries, Linux iSeries, and Solaris *only*.	226
inactive	Displays a list of active and inactive files when used with the *pick* option.	229
latest	Restores the most recent backup version of a file whether it is active or inactive.	242
localbackupset	Specifies whether the Tivoli Storage Manager GUI bypasses initial logon with the server to restore a local backup set on a standalone workstation.	243
location	Specifies where Tivoli Storage Manager searches for the backup set during a query or restore operation.	244
makesparsefile	Use the *makesparsefile* option with the **restore** or **retrieve** commands to specify how sparse files are recreated.	245
monitor	Specifies whether you want to monitor an image restore of one or more file systems belonging to a Network Attached Storage (NAS) file server.	253
noprompt	Suppresses the confirmation prompt that normally appears before you delete an archived file after using the *deletefiles* option with the *archive* command, or when performing an image restore operation.	259
optfile	Specifies the client user options file you want to use when you start a Tivoli Storage Manager session.	262

Table 49. Restore and retrieve processing options (continued)

Option	Description	Page
pick	Creates a list of backup versions, images, or archive copies that match the file specification you enter. From the list, you can select the versions to process. Include the **inactive** option to view both active and inactive objects.	267
pitdate	Use the **pitdate** option with the **pittime** option to establish a point in time for which you want to display or restore the latest version of your backups.	268
pittime	Use the **pittime** option with the **pitdate** option to establish a point in time for which you want to display or restore the latest version of your backups.	269
preservepath	Specifies how much of the source path to reproduce as part of the target directory path when you restore or retrieve files to a new location.	276
replace	Specifies whether to overwrite an existing file, or to prompt you for your selection when you restore or retrieve files.	282
subdir	Specifies whether you want to include subdirectories of a named directory.	307
showmembers	Displays all members of a group.	302
tapeprompt	Specifies whether you want Tivoli Storage Manager to wait for a tape required for a restore or retrieve to be mounted, or to prompt you for your choice.	309
todate	Use the **todate** option with the **totime** option to specify an ending date and time to which you want to search for backups or archives during a restore, retrieve, or query operation.	323
totime	Use the **totime** option with the **todate** option to specify an ending date and time to which you want to search for backups or archives during a restore, retrieve, or query operation.	323
type	Use the **type** option with the **query node** command to specify the type of node to query.	326
verifyimage	Use the **verifyimage** option with the **restore image** command to specify that you want to enable detection of bad sectors on the destination target volume. If bad sectors are detected on the target volume, Tivoli Storage Manager issues a warning message on the console and in the error log. This option is valid for AIX, HP-UX, Linux86, Linux IA64, Linux pSeries, Linux iSeries, and Solaris *only*.	330
washome	Use the **washome** option in your client user options file (dsm.opt) to specify an override base install path for the Application Server	337

Table 49. Restore and retrieve processing options (continued)

Option	Description	Page
wasndhome	Use the *wasndhome* option in your client user options file (dsm.opt) to specify an override base install path for the Network Deployment Manager.	338
wastype	Use the *wastype* option with the **restore was** command to restore the WAS Network Deployment Manager or Application Server.	340

Scheduling options

You can use the following options to regulate central scheduling. Tivoli Storage Manager uses scheduling options only when the Scheduler is running.

Table 50. Scheduling options

Option	Description	Page
managedservices	Specifies whether the Storage Manager Client Acceptor daemon manages the Web client, the scheduler, or both.	247
maxcmdretries	Specifies the maximum number of times the client scheduler attempts to process a scheduled command that fails.	249
postschedulecmd, postnschedulecmd	Specifies a command to process after running a schedule.	270
preschedulecmd, prenschedulecmd	Specifies a command to process before running a schedule.	272
queryschedperiod	Specifies the number of hours the client scheduler waits between unsuccessful attempts to contact the server for scheduled work.	279
retryperiod	Specifies the number of minutes the client scheduler waits between attempts to process a scheduled command that fails or between unsuccessful attempts to report results to the server.	287
schedcmddisabled	Specifies whether to disable the scheduling of generic commands specified by your Tivoli Storage Manager administrator.	289
schedcmduser (server defined only)	The scheduler executes commands under a uid of 0, however, there may be some users who have a different user ID. In this case, your Tivoli Storage Manager administrator can define schedules and allow these schedules to be executed under a uid other than 0, using this option. The Tivoli Storage Manager Client API does not support this option.	134
schedlogname	Specifies the path and file name where you want to store schedule log information.	290
schedlogretention	Specifies the number of days to keep log file entries in the schedule log, and whether to save pruned entries.	291
schedmode	Specifies which schedule mode to use, *polling* or *prompted*.	292

Table 50. Scheduling options (continued)

Option	Description	Page
sessioninitiation	Use the *sessioninitiation* option to control whether the server or client initiates sessions through a firewall. The default is that the client can initiate sessions.	299
tcpclientaddress	Specifies a TCP/IP address if your client node has more than one address, and you want the server to contact an address other than the one that was used to make the first server contact. Use this option only if you specify the *prompted* parameter with the *schedmode* option or when the **schedule** command is running.	313
tcpclientport	Specifies a different TCP/IP port number for the server to contact than the one that was used to make the first server contact. Use this option only if you specify the *prompted* parameter with the *schedmode* option or when the **schedule** command is running.	314

Format options

You can use the following options to select different formats for date, time, and numbers.

Table 51. Format options

Option	Description	Page
dateformat	Specifies the format for displaying dates.	184
numberformat	Specifies the format for displaying numbers.	260
timeformat	Specifies the format for displaying time.	319

Command processing options

The following options apply when you use Tivoli Storage Manager commands.

Table 52. Command processing options

Option	Description	Page
editor	Specifies if the command-line interface editor and command retrieve capability is turned on or off.	201
quiet	Limits the number of messages that display on your screen during processing. This option can be overidden by the server.	280
scrolllines	Specifies the number of lines of information that display on your screen at one time. Use this option only when *scrollprompt* is set to *yes.*	294
scrollprompt	Specifies whether you want Tivoli Storage Manager to stop and wait after displaying the number of lines of information you specified with the *scrolllines* option, or scroll through and stop at the end of the information list.	295

Table 52. Command processing options (continued)

Option	Description	Page
verbose	Specifies that processing information should display on your screen. The alternative is *quiet*. This option can be overridden by the server.	329

Authorization options

These options control access to a Tivoli Storage Manager server.

Table 53. Authorization options

Option	Description	Page
encryptkey	Specifies whether to save the encryption key password locally when performing a backup-archive operation or whether to prompt for the encryption key password.	204
groups	Specifies the groups on your workstation that you want to authorize to request Tivoli Storage Manager services from the server.	222
mailprog	Specifies the program and user ID where you want to send a newly-generated password when the old one expires.	246
password	Specifies a Tivoli Storage Manager password.	263
passwordaccess	Specifies whether you want to generate your password automatically or set as a user prompt.	264
passworddir	Specifies the directory in which you want to store the automatically generated password for your client node. The encryption key and password are encrypted and stored in the TSM.PWD file.	266
revokeremoteaccess	Restricts an administrator with client access privileges from accessing your workstation through the Web client.	288
users	Authorizes specific users on your workstation to request services from a server.	327

Error processing options

These options specify the name of the error log file and how Tivoli Storage Manager treats the entries in the log file.

Table 54. Error processing options

Option	Description	Page
errorlogname	Specifies the fully qualified path and file name of the file where you want to store information about errors that occur during processing.	206
errorlogretention	Specifies how many days to maintain error log entries before pruning, and whether to save the pruned entries.	207

Transaction processing options

These options control how Tivoli Storage Manager processes transactions between the client and server.

Table 55. Transaction processing options

Option	Description	Page
collocatebyfilespec	Specifies that you want the Tivoli Storage Manager client to use only one server session to send objects generated from one file specification. Setting the *collocatebyfilespec* option to *yes* eliminates interspersing of files from different file specifications, by limiting the client to one server session per file specification. Therefore, if you store the data to tape, files for each file specification are stored together on one tape (unless another tape is required for more capacity).	175
commrestartduration	Specifies the maximum number of minutes you want the client to try to reconnect to a Tivoli Storage Manager server after a communication error occurs.	178
commrestartinterval	Specifies the number of seconds you want the client to wait between attempts to reconnect to a Tivoli Storage Manager server after a communication error occurs.	179
largecommbuffers	Specifies whether the client uses increased buffers to transfer large amounts of data between the client and the server.	241
nfstimeout	Specifies the number of seconds the server waits for a status system call on an NFS file system before it times out.	255
resourceutilization	Use the *resourceutilization* option in your client system options file dsm.sys to regulate the level of resources the Tivoli Storage Manager server and client can use during processing.	284
txnbytelimit	Specifies the number of kilobytes the client program buffers before it sends a transaction to the server.	325

Web client options

The following are options for the Tivoli Storage Manager Web Client.

Table 56. Web client options

Option	Description	Page
httpport	Specifies a TCP/IP port address for the Web client.	224
managedservices	Specifies whether the Storage Manager Client Acceptor daemon manages the Web client, the scheduler, or both.	247
revokeremoteaccess	Restricts administrator access on a client workstation through the Web client.	288

Table 56. Web client options (continued)

Option	Description	Page
webports	Enables the use of the Web client outside a firewall by specifying the TCP/IP port number used by the Client Acceptor daemon and the Web Client Agent service for communications with the Web GUI.	342

Diagnostics options

Use the **query systeminfo** command to gather Tivoli Storage Manager system information and output this information to a file or the console. The **query systeminfo** command is intended primarily as a diagnostic aid. You can submit the resulting information to technical support personnel for problem diagnosis. See "Query Systeminfo" on page 403 for more information.

Table 57. Diagnostics options

Option	Description	Page
console	Use the *console* option with the **query systeminfo** command to output system information to the console.	183
filename	Use the *filename* option with the **query systeminfo** command to specify a file name in which to store the system information.	214

Using options with commands

You can override some of the options in your client system options file (dsm.sys) or client user options file (dsm.opt) by entering them with appropriate Tivoli Storage Manager commands.

Tivoli Storage Manager processes options in the following order (precedence):
1. Options defined on the server with server-enforced client options. The server overrides client values.
2. Options entered locally on the command line.
3. Options defined on the server for a schedule using the options parameters.
4. Options entered locally in the options file.
5. Options received from the server with client options not enforced by the server. The server *does not* override client values.
6. Default option values.

Tivoli Storage Manager also includes a group of client command options that you can enter *only* on the command line with specific commands. For a complete list of command line options, a description, and where to go in this book for more information, see Table 58 on page 162.

Entering options with a command

Follow these general rules to enter options with a command:

- Enter a command, a dash (–), the option name, an equal sign (=), and the option value or parameter. There should be no spaces on either side of the = sign. For example,

      dsmc archive -description="year end 1999" /home/

- For options that do not include parameters, enter a command, a dash (–) and the option name. For example,

  ```
  dsmc incremental -quiet
  ```

  Note: Use a leading dash (-) to indicate that the following text is the name of an option. If an object name begins with a dash, you must surround it in either single quotes (') or double quotes (″). Most operating system command line processors strip the quotes before submitting the command line arguments to the Tivoli Storage Manager client application. In such cases, using escape characters or doubling the quotes allows the client to receive the quoted object name. In loop mode, surround such objects in either single quotes (') or double quotes (″).

- Enter either the option name, or an abbreviation for the option name. For example, to enter the *latest* option, enter either `-lat` or `-latest`. The capital letters in the syntax of each option indicate the minimum abbreviation for that option name. For information about how to read the syntax diagrams, see "Reading syntax diagrams" on page xiii.

- Enter options before or after command parameters. For example, you can enter the *subdir* option before or after a file specification:

  ```
  dsmc selective -subdir=yes "/home/devel/proj1/*"
  dsmc selective "/home/devel/proj1/*" -subdir=yes
  ```

- When entering several options on a command, separate each with a blank space.

- Enclose the value in quotes (" ") if the option value that you enter contains a blank space. For example:

  ```
  dsmc archive -description="Project A" "/home/devel/proj1/*"
  ```

- Any option that you enter on the command line, with the exception of *domain*, overrides the value set in the client options file. When you use the *domain* option with the **incremental** command, it adds to the domain specified in your client options file rather than overriding the current value.

- The maximum number of characters for a file name is 256. The maximum combined length of the file name and path name is 1024 characters.

Table 58 lists client command options that you can enter only on the command line with specific commands.

Table 58. Client command options

Command option	Description	Commands	Page
archmc	Use the *archmc* option with the **archive** command to specify the available management class for your policy domain to which you want to bind your archived files.	**archive**	169
class	Specifies whether to display a list of NAS objects or client objects when using the following commands:	**query backup** **delete filespace** **query filespace**	173
console	Use the *console* option with the **query systeminfo** command to output system information to the console.	**query systeminfo**	183
deletefiles	Deletes the local copy of files from your workstation after they are archived on the server. Can also be used with the **restore image** command and the *incremental* option to delete files from the restored image that are deleted from the file space after the image is created.	**archive** **restore image**	188

Table 58. Client command options (continued)

Command option	Description	Commands	Page
description	Assigns or specifies a description for files when performing archive, delete, retrieve, or query archive operations.	**archive** **delete archive** **query archive** **query backupset** **retrieve**	189
detail	Displays management class, file space, backup, and archive information depending on the command with which it is used.	**delete filespace** **query archive** **query backup** **query filespace** **query mgmtclass**	191
dirsonly	Backs up, restores, archives, retrieves, or queries directories *only*.	**archive** **incremental** **query archive** **query backup** **restore** **restore backupset** **retrieve** **selective**	193
filelist	Specifies a list of files to be processed for the command. Tivoli Storage Manager opens the designated filelist and processes the files listed within according to the command.	**archive** **backup group** **delete archive** **expire** **incremental** **query archive** **query backup** **restore** **retrieve** **selective**	212
filename	Use the *filename* option with the **query systeminfo** command to specify a file name in which to store the system information.	**query systeminfo**	214
filesonly	Backs up, restores, retrieves, or queries files *only*.	**archive** **incremental** **query archive** **query backup** **restore** **restore backupset** **retrieve** **selective**	215
fromdate	Use the *fromdate* option with the *fromtime* option to specify a date and time from which you want to search for backups or archives during a restore, retrieve, or query operation.	**query archive** **query backup** **restore** **retrieve** **restore group** **restore was**	217

Table 58. Client command options (continued)

Command option	Description	Commands	Page
fromnode	Permits one node to perform commands for another node. A user on another node must use the **set access** command to permit you to query, restore, or retrieve files or images for the other node.	**query archive** **query backup** **query filespace** **query group** **query image** **query mgmtclass** **query was** **restore** **restore group** **restore image** **restore was** **retrieve**	218
fromowner	Displays file spaces for an alternate owner. Also specifies an alternate owner from which to restore or retrieve files.	**query archive** **query backup** **query group** **query image** **query was** **restore** **restore image** **restore group** **restore was** **retrieve**	219
fromtime	Specifies a beginning time on the specified date. Use with the *fromdate* option. This option is ignored if the *fromdate* option is absent.	**query archive** **query backup** **restore** **restore group** **retrieve** **restore was**	220
groupname	Specifies the fully qualified name for a group.	**backup group**	221
ifnewer	Replaces existing files with the latest backup version only if the backup version is newer than the existing version.	**restore** **restore backupset** **restore group** **retrieve** **restore was**	225
imagetofile	Use the *imagetofile* option with the **restore image** command to specify that you want to restore the source image to a file. You may need to restore the image to a file in the event of bad sectors present on the target volume, or if you want to do some manipulations with the image data. This option is valid for AIX, HP-UX, Linux86, Linux IA64, Linux pSeries, Linux iSeries, and Solaris *only*.	**restore image**	226
inactive	Displays a list of active and inactive files when used with the *pick* option.	**delete group** **query backup** **query group** **query image** **query nas** **query was** **restore** **restore group** **restore image** **restore nas** **restore was**	229
incrbydate	Requests an incremental backup by date.	**incremental**	235

Table 58. Client command options (continued)

Command option	Description	Commands	Page
incremental	Applies changes to the base image using information from incremental backups made after the original image backup. This option is valid for AIX, HP-UX, Linux86, Linux IA64, Linux pSeries, Linux iSeries, and Solaris *only*.	**restore image**	236
latest	Restores the most recent backup version of a file whether it is active or inactive.	**restore** **restore group** **restore was**	242
location	Specifies whether Tivoli Storage Manager searches for a backup set on the server, in local files, or on a tape device during a query or restore operation.	**query backupset** **restore backupset**	244

mode	Use the *mode* option with these commands, as follows:
	
	backup image
	    To specify whether to perform a selective or incremental image backup of client file systems.
	
	backup nas
	    To specify whether to perform a full or differential image backup of NAS file systems.
	
	backup was
	    To specify whether to perform a full or differential backup of the WebSphere Application Server (WAS) Network Deployment Manager (contains setup, application files, and configuration information) or the Application Server to the Tivoli Storage Manager server.
	
	backup group
	    To specify whether to perform a full or differential group backup containing a list of files from one or more file space origins.
		backup group
		backup nas
		backup image
		backup was
		restore nas
			251

monitor	Specifies whether you want to monitor an image backup or restore of one or more file systems belonging to a Network Attached Storage (NAS) file server.	**backup nas** **restore nas**	253
noprompt	Suppresses the confirmation prompt that normally appears before you delete an archived file after using the *deletefiles* option with the *archive* command, or when performing an image restore operation.	**delete archive** **delete group** **expire** **restore image**	259
optfile	Specifies the client user options file you want to use when you start a Tivoli Storage Manager session.	**dsmc.exe**	262

Table 58. Client command options (continued)

Command option	Description	Commands	Page
pick	Creates a list of backup versions, images, or archive copies that match the file specification you enter. From the list, you can select the versions to process. Include the *inactive* option to view both active and inactive objects.	**delete archive** **delete group** **expire** **query nas** **restore** **restore group** **restore image** **restore nas** **restore was** **retrieve**	267
pitdate	Use the *pitdate* option with the *pittime* option to establish a point in time for which you want to display or restore the latest version of your backups.	**query backup** **query group** **query image** **query nas** **query was** **restore** **restore group** **restore image** **restore nas** **restore was**	268
pittime	Use the *pittime* option with the *pitdate* option to establish a point in time for which you want to display or restore the latest version of your backups.	**query backup** **query image** **query nas** **restore** **restore image** **restore nas**	269
preservepath	Specifies how much of the source path to reproduce as part of the target directory path when you restore or retrieve files to a new location.	**restore** **restore backupset** **retrieve** **restore was**	276
removeoperandlimit	Specifies that Tivoli Storage Manager removes the 20-operand limit for Unix-family platforms. If you specify the *removeoperandlimit* option with the **incremental**, **selective**, or **archive** commands, the 20-operand limit is not enforced and is restricted only by available resources or other operating system limits.	**incremental** **selective** **archive**	281
showmembers	Displays all members of a group.	**query group** **query was** **restore group** **restore was**	302
todate	Use the *todate* option with the *totime* option to specify an ending date and time to which you want to search for backups or archives during a restore, retrieve, or query operation.	**query archive** **query backup** **restore** **retrieve** **restore group** **restore was**	323
totime	Use the *totime* option with the *todate* option to specify an ending date and time to which you want to search for backups or archives during a restore, retrieve, or query operation.	**query archive** **query backup** **restore** **retrieve** **restore group** **restore was**	324

Table 58. Client command options (continued)

Command option	Description	Commands	Page
type	Use the *type* option with the **query node** command to specify the type of node to query.	**query node**	326
v2archive	Use the *v2archive* option with the **archive** command to archive only files to the server. Tivoli Storage Manager will not process directories that exist in the path of the source file specification.	**archive**	328
verifyimage	Use the *verifyimage* option with the **restore image** command to specify that you want to enable detection of bad sectors on the destination target volume. If bad sectors are detected on the target volume, Tivoli Storage Manager issues a warning message on the console and in the error log. This option is valid for AIX, HP-UX, Linux86, Linux IA64, Linux pSeries, Linux iSeries, and Solaris *only*.	**restore image**	330
virtualfsname	Specifies the name of the virtual file space for the group on which you want to perform the operation.	**backup group**	331
wasnode	Use the *wasnode* option with the **set waspassword** commands to specify the WAS node name when performing the operation on the WAS Network Deployment Manager or Application Server.	**set waspassword**	339
wastype	Use the *wastype* option with the **backup was**, **query was**, **restore was**, or **set waspassword** commands to perform the operation on the WAS Network Deployment Manager or Application Server.	**backup was** **query was** **restore was** **set waspassword**	340
wasuser	If WAS security is enabled, use the *wasuser* option with the **set waspassword** command to set the user name for each installation of WAS on your machine.	**set waspassword**	341

Initial command line only options

There is a subset of client options that are valid on the initial command line only. Many of these options establish the runtime environment, such as the *commmethod* and *optfile* options. Options in this category are not valid in interactive, macro, or scheduler modes. If used in interactive and macro mode, these options generate an error and cause processing to stop. If used in scheduler mode, they generate a warning message, but are ignored and processing continues. The following options are valid on the initial command line only:

Table 59. Options that are valid on the initial command line only

clusternode	*preschedulecmd, prenschedulecmd*
commmethod	*queryschedperiod*
editor	*resourceutilization*
enablelanfree	*retryperiod*
errorlogname	*schedlogname*
errorlogretention	*schedlogretention*
lanfreecommmethod	*schedmode*
lanfreeshmport	*servername*
lanfreetcpport	*sessioninitiation*
language	*tapeprompt*
largecommbuffers	*tcpbuffsize*
maxcmdretries	*tcpclientaddress*
nfstimeout	*tcpclientport*
nodename	*tcpport*
optfile	*tcpserveraddress*
password	*tcpwindowsize*
postschedulecmd, postnschedulecmd	*txnbytelimit*
	virtualnodename

Client options reference

The following sections contain detailed information about each of the Tivoli Storage Manager processing options. Information for each option includes:

- A description of the option.
- A syntax diagram of the option. The option name contains uppercase and lowercase characters. The uppercase characters indicate the minimum abbreviation you can use for the option name. See "Reading syntax diagrams" on page xiii for an explanation of these diagrams.
- Detailed descriptions of the option parameters. If the parameter is a constant (a value that does not change), use the minimum abbreviation.
- Examples of using the option in the client options file (if applicable).
- Examples of using the option on the command line (if applicable). Options with a command line example of **Does not apply** cannot be used with command line or scheduled commands.

Note: For options with a **yes** parameter, acceptable alternatives are **1**, **true**, and **on**. For options with a **no** parameter, acceptable alternatives are **0**, **false**, and **off**.

Archmc

Use the *archmc* option with the **archive** command to specify the available management class for your policy domain to which you want to bind your archived files and directories. When you archive a file, you can override the assigned management class using the *archmc* option on the **archive** command or by using the graphical user interface (GUI). Overriding the management class using the GUI is equivalent to using the *archmc* option on the **archive** command.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──ARCHMc =─managementclass────────────────────────────────────►◄
```

Parameters

managementclass
> Specifies an available management class in the active policy set of your policy domain. This management class overrides the default management class and any *include* statements for the files and directories you are archiving.

Examples

Command line:
```
dsmc archive –archmc=ret2yrs /home/plan/proj1/budget.jan
```

Archsymlinkasfile

The ***archsymlinkasfile*** option specifies whether Tivoli Storage Manager follows a symbolic link and archives the file or directory to which it points, or archives the symbolic link only. Use this option with the **archive** command.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

```
           ┌─Yes─┐
►►──ARCHSYMLinkasfile──┤     ├──────────────────────────────────►◄
           └─No──┘
```

Parameters

Yes Specifies that Tivoli Storage Manager follows a symbolic link and archives the associated file or directory. This is the default.

No Specifies that Tivoli Storage Manager archives the symbolic link and not the associated file or directory.

Examples

Options file:
```
archsymlinkasfile no
```

Command line:
```
-archsyml=no
```

Automount

Authorized User

The *automount* option adds an automounted file system into the domain by mounting it. Use this option with the *domain* option.

Use this option to specify all automounted file systems the Tivoli Storage Manager client tries to mount at the following points in time:
- When Tivoli Storage Manager client starts
- When the back up is started
- When the Tivoli Storage Manager client has reached an automounted file system during backup

It is unnecessary to explicitly specify an automounted file system in the *automount* statement if you use the keywords *all-auto-nfs* or *all-auto-lofs* in the domain statement and the file system is already mounted. However, you should add this file system in the *automount* statement to ensure the file system has been mounted at all the points in time mentioned above. The automounted file systems are remounted if they have gone offline in the meantime during a backup.

See "Domain" on page 194 for more information about working with automounted file systems and the *domain* option.

Supported Clients

This option is valid for all UNIX platforms. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

```
►►──AUTOMount──┬──filespacename──┬──────────────────────────►◄
              └◄─────────────────┘
```

Parameters

filespacename
Specifies one or more automounted file systems that are mounted and added into the domain.

Examples

Options file:
automount fs1 fs2

Command line:
Does not apply.

Changingretries

Authorized User

The *changingretries* option specifies how many additional times you want the client to attempt to back up or archive a file that is in use. Use this option with the **archive**, **incremental**, and **selective** commands.

This option is applied only when *serialization*, an attribute in a management class copy group, is *shared static* or *shared dynamic*.

With *shared static* serialization, if a file is open during an operation, the operation repeats the number of times that you specify. If the file is open during each attempt, the operation does not complete.

With *shared dynamic* serialization, if a file is open during an operation, the operation repeats the number of times that you specify. The backup or archive occurs during the last attempt whether the file is open or not.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Backup** category, **Number of retries if file is in use** field of the Preferences editor.

Syntax

```
►►──CHAngingretries─ numberretries───────────────────────────────────►◄
```

Parameters

numberretries
> Specifies the number of times a backup or archive operation is attempted if the file is in use. The range of values is zero through 4; the default is 4.

Examples

Options file:
> changingretries 3

Command line:
> -cha=3

Class

The *class* option specifies whether to display a list of NAS or client objects when using the following commands:
- **query backup**
- **delete filespace**
- **query filespace**

For example, to display a list of the file spaces belonging to a NAS node, enter the following command:

```
query filespace -class=nas
```

Supported Clients

This option is valid for AIX and Solaris clients *only*. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──CLASS =─┬─client─┬──────────────────────────────────►◄
            └─nas────┘
```

Parameters

client
> Specifies that you want to display a list of file spaces for a client node. This is the default.

nas
> Specifies that you want to display a list of file spaces for a NAS node.

Examples

Command line:
> ```
> q backup -nasnodename=nodename -class=nas
> ```

Clusternode

The *clusternode* option specifies whether Tivoli Storage Manager participates in a High Availability Cluster Multi Processing (HACMP) environment. For information on how to configure a Tivoli Storage Manager server to manage a cluster configured client, see Appendix B, "Configuring the backup-archive client in an HACMP takeover environment," on page 447.

Note: You must set the *clusternode* option to *yes* for all Tivoli Storage Manager-managed cluster operations. Inconsistent use of the *clusternode* option for a given Tivoli Storage Manager cluster node name can cause Tivoli Storage Manager to invalidate the cluster node name encrypted password, and prompt the user to reenter the password during the next Tivoli Storage Manager program invocation.

Use the *optfile* option to properly call the correct (cluster) dsm.opt for all Tivoli Storage Manager programs to ensure proper Tivoli Storage Manager functionality for cluster related operations. See "Optfile" on page 262 for more information.

Supported Clients

This option is valid for the AIX clients.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

```
          ┌─No──┐
►►──CLUSTERnode─┤     ├──────────────────────────────────►◄
          └─Yes─┘
```

Parameters

Yes Specifies that you want Tivoli Storage Manager to back up cluster resources and participate in cluster failover for high availability.

No Specifies that you do not want the Tivoli Storage Manager client to participate in cluster failover. This is the default.

Examples

Options file:
```
cluster no
```

Command line:
```
-cluster=yes
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Collocatebyfilespec

Use the ***collocatebyfilespec*** option to specify whether the Tivoli Storage Manager client uses only one server session to send objects generated from one file specification.

Setting the ***collocatebyfilespec*** option to *yes* eliminates interspersing of files from different file specifications, by limiting the client to one server session per file specification. Therefore, if you store the data to tape, files for each file specification are stored together on one tape (unless another tape is required for more capacity).

Considerations:

- Use the ***collocatebyfilespec*** option only if the storage pool is going directly to tape, the ***resourceutilization*** is set to 5 or greater, and you enter the backup command with multiple file specifications.
- If you use the ***collocatebyfilespec*** option going to a disk storage pool, you could affect some load balancing, and therefore, performance.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

```
            ┌─No──┐
►►──COLlocatebyfilespec──┤     ├──►◄
            └─Yes─┘
```
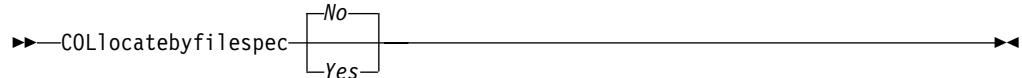
Parameters

Yes   Specifies that you want the Tivoli Storage Manager client to use only one server session to send objects generated from one file specification. Therefore, if you store the data to tape, files for each file specification are stored together on one tape, unless another tape is required for more capacity. Restore performance can increase as a result.

No   Specifies that the Tivoli Storage Manager client may (depending on the execution dynamics and on the setting of the ***resourceutilization*** option of 3 or higher), use more than one server session to send the files from one file specification. This is the default.

Backup performance may increase as a result. If the files are backed up to tape, files will be stored on multiple tapes. Generally, the files specified in the file specification will still be contiguous.

Examples

Options file:
        collocatebyfilespec yes

Command line:
        -collocatebyfilespec=yes

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the client system options file (dsm.sys) unless overridden by the initial command line or by an option forced by the server.

Commmethod

Authorized User

The *commmethod* option specifies the communication method you use to provide connectivity for client-server communication.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Communication** category, **Communication Method** list of the Preferences editor.

Syntax

```
►►──COMMMethod──┬── TCPip ───────┬─────────────────────────────────────────►◄
                └── SHAREdmem ───┘
```
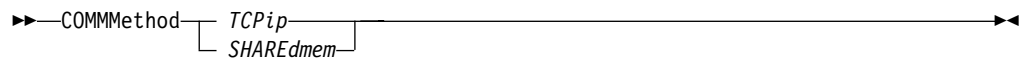
Parameters

The Transmission Control Protocol/Internet Protocol (TCP/IP) communication method. This is the default.

SHAREdmem
> Use the Shared Memory communication method when the client and server are running on the same system. This provides better performance over the TCP/IP protocol. This communication method is valid for AIX, HP-UX, and Solaris clients *only*.
>
> When specifying this communication method on AIX, the client can be logged in as root or non-root, as long as the server is running as root. If the server is not running as root, the user ID running the client must match the user ID running the server.

Examples

Options file:
> commm tcpip

Command line:
> -commm=tcpip

This option is valid only on the initial command line. It is not valid in interactive mode.

Commrestartduration

Authorized User

The *commrestartduration* option specifies the maximum number of minutes you want the client to try to reconnect to a Tivoli Storage Manager server after a communication error occurs.

Note: A scheduled event will continue if the client reconnects with the server before the *commrestartduration* value elapses, even if the event's startup window has elapsed.

You can use the *commrestartduration* option and the *commrestartinterval* in busy or unstable network environments to decrease connection failures.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Communication** category, **Common Options** section of the Preferences editor.

Syntax

```
►►──COMMRESTARTDuration─ minutes─────────────────────────────────────────►◄
```

Parameters

minutes
> The maximum number of minutes you want the client to attempt to reconnect with a server after a communication failure occurs. The range of values is zero through 9999; the default is 60.

Examples

Options file:
> commrestartduration 90

Command line:
> Does not apply.

Commrestartinterval

Authorized User

The *commrestartinterval* option specifies the number of seconds you want the client to wait between attempts to reconnect to a Tivoli Storage Manager server after a communication error occurs.

Note: Use this option only when *commrestartduration* is a value greater than zero.

You can use the *commrestartduration* option and the *commrestartinterval* in busy or unstable network environments to decrease connection failures.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Communication** category, **Common Options** section of the Preferences editor.

Syntax

```
►►──COMMRESTARTInterval─ seconds──────────────────────────────────────────►◄
```

Parameters

seconds

The number of seconds you want the client to wait between attempts to reconnect with a server after a communication failure occurs. The range of values is zero through 65535; the default is 15.

Examples

Options file:
```
commrestartinterval 30
```

Command line:
```
Does not apply.
```

Compressalways

The *compressalways* option specifies whether to continue compressing an object if it grows during compression. Use this option with the *compression* option.

Use the *compressalways* option with the **archive**, **incremental**, and **selective** commands.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option.

Options File

Place this option in the client user options file (dsm.opt). You can set this option on the **Backup** category, **Continue Compressing if Object Grows** check box of the Preferences editor.

Syntax

```
>>──COMPRESSAlways──┬─Yes─┬──────────────────────────────────────────><
                    └─No──┘
```
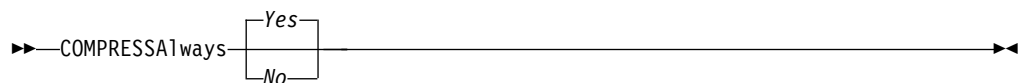
Parameters

Yes   File compression continues even if the file grows as a result of compression. This is the default.

No   Backup-archive client objects are resent uncompressed if they grow during compression. API behavior depends on the application. Application backups may fail.

Examples

Options file:
```
compressalways yes
```

Command line:
```
-compressa=no
```

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file unless overridden by the initial command line or by an option forced by the server.

Compression

Authorized User

The *compression* option compresses files *before* you send them to the server. Compressing your files reduces data storage for backup versions and archive copies of your files. It can, however, affect Tivoli Storage Manager throughput. A fast processor on a slow network connection benefits from compression, but a slow processor on a fast network connection does not.

Use the *compression* option with the **archive**, **incremental**, and **selective** commands. The **backup image** command uses the *compression* option value specified in the dsm.sys. This option is valid on the initial command line and in interactive mode. The server can also define this option which overrides the client value.

If you set the *compressalways* option to *yes*, compression continues even if the file size increases. To stop compression if the file size grows, and resend the file uncompressed, set the *compressalways* option to *no*.

If you set the *compression* option to *yes*, you can control compression processing in the following ways:
- Use the *exclude.compression* option in your client system options file (dsm.sys) to exclude specific files or groups of files from compression processing. See "Exclude options" on page 208 for more information.
- Use the *include.compression* option in your client system options file (dsm.sys) to include files within a broad group of excluded files for compression processing. See "Include options" on page 231 for more information.

This option controls compression *only if* your administrator specifies that your client node can compress files before sending them to the server.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza. You can set this option on the **Backup** category, **Compress objects** check box of the Preferences editor.

Syntax

```
              ┌─No──┐
►►──COMPRESSIon─┤     ├──────────────────────────────────►◄
              └─Yes─┘
```

Parameters

No   Files are not compressed before they are sent to the server. This is the default.

Yes   Files are compressed before they are sent to the server.

Examples

Options file:
```
compression yes
```

Command line:
```
-compressi=no
```

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.sys file unless overridden by the initial command line or by an option forced by the server.

Console

Use the *console* option with the **query systeminfo** command to output information gathered from one or more of the following items to the console:

- DSMOPTFILE - The contents of dsm.opt file.
- DSMSYSFILE - The contents of the dsm.sys file.
- ENV - Environment variables.
- ERRORLOG - The Tivoli Storage Manager error log file.
- FILE - Attributes for the file name that you specify.
- INCLEXCL - Compiles a list of include-exclude in the order in which they are processed during backup and archive operations.
- OPTIONS - Compiled options.
- OSINFO - Name and version of the client operating system (includes ULIMIT information for UNIX).
- POLICY - Policy set dump.
- SCHEDLOG - The contents of the Tivoli Storage Manager schedule log (usually dsmsched.log).
- CLUSTER - AIX cluster information.

Note: The **query systeminfo** command is intended primarily as an aid for IBM support to assist in diagnosing problems, although users who are familiar with the concepts addressed by this information may also find it useful. If you use the *console* option, no special formatting of the output is performed to accommodate screen height or width. Therefore, the console output may be difficult to read due to length and line-wrapping. In this case, it is recommended that you use the *filename* option with the **query systeminfo** command to allow the output to be written to a file that can subsequently be submitted to IBM support. See "Filename" on page 214 for more information.

Supported Clients

This option is valid for all UNIX clients.

Syntax

```
►►──CONsole───────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
query systeminfo dsmoptfile errorlog -console
```

Dateformat

The *dateformat* option specifies the format you want to use to display dates.

The AIX, Solaris, and HP-UX clients support locales other than English that describe every user interface that varies with location or language. See Table 15 on page 39 for supported locales. The following are default directories for system-supplied locales:
- `/usr/lib/nls/loc` for AIX
- `/usr/lib/locale` for Solaris
- `/usr/lib/nls/loc/locales` for HP-UX

The backup-archive and administrative clients obtain format information from the locale definition in effect at the time you start the client. Consult the documentation on your local system for details about setting up your locale definition.

Notes:

1. The *dateformat* option does not affect the Web client. The Web client uses the date format for the locale that the browser is running in. If the browser is not running in a locale that Tivoli Storage Manager supports, the Web client uses the date format for US English.

2. When you change the date format and use the *schedlogretention* option to prune the schedule log, Tivoli Storage Manager removes all entries in the schedule log with a different date format when pruning the log. When you change the date format and use the *errorlogretention* option to prune the error log, Tivoli Storage Manager removes all entries in the error log with a different date when pruning the log. When changing the date format, copy the schedule log and error log if you want to preserve log entries that contain a different date format.

You can use the *dateformat* option with the following commands:
- **delete archive**
- **expire**
- **query archive**
- **query backup**
- **query filespace**
- **query image**
- **query nas**
- **query was**
- **restore**
- **restore image**
- **restore nas**
- **retrieve**
- **restore was**

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt). You can set this option on the **Regional Settings** category, **Date Format** drop-down list of the Preferences editor.

Syntax

```
►►──DATEformat─ format_number─────────────────────────────────────────►◄
```

Parameters

format_number

Displays the date using one of the following formats. Select the number that corresponds to the date format you want to use:

0 Use the locale-specified date format. For AIX, HP-UX, and Solaris: This is the default if the locale-specified date format consists of digits and separator characters.

1 MM/DD/YYYY

For AIX, HP-UX, and Solaris: This is the default if the locale-specified date format consists of anything but digits and separator characters.

This is the default for the following supported languages:
- US English
- Chinese (Traditional)
- Korean

2 DD-MM-YYYY

This is the default for the following supported languages:
- Brazilian Portuguese
- Italian

3 YYYY-MM-DD

This is the default for the following supported languages:
- Japanese
- Chinese (Simplified)
- Polish

4 DD.MM.YYYY

This is the default for the following supported languages:
- German
- French
- Spanish
- Czech
- Russian

5 YYYY.MM.DD

This is the default for the following supported languages:
- Hungarian

For AIX, HP-UX, and Solaris: To set a particular date format, edit the source file for your locale and modify the **d_fmt** line to support your needs. Whatever date format you select applies both to output and to input; however, the input year can be either 2 or 4 digits.

″%m/%d/%y″

Displays the date in the form MM/DD/YY

″%d.%m.%Y″

Displays the date in the form DD.MM.YYYY

When you include the *dateformat* option with a command, it must precede the *fromdate*, *pitdate*, and *todate* options.

Examples

Options file:
```
dateformat 3
```

Command line:
```
-date=3
```

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file unless overridden by the initial command line or by an option forced by the server.

Defaultserver

Authorized User

Use the *defaultserver* option to specify the name of the Tivoli Storage Manager server to contact for backup-archive services by default if more than one server is defined in the client system options file (dsm.sys).

If you have the HSM client installed on your workstation, and you do not specify a migration server with the *migrateserver* option, use this option to specify the server to which you want to migrate files. See *IBM Tivoli Storage Manager for Space Management for UNIX User's Guide* for more information.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option *at the beginning* of the client system options file (dsm.sys) *before* any server stanzas.

Syntax

```
►►──DEFAULTServer─ servername───────────────────────────────────────►◄
```

Parameters

servername
Specifies the name of the default server to which you back up or archive files. The server to which files are migrated from your local file systems can also be specified with this option.

Examples

Options file:
```
defaults server_a
```

Command line:
```
Does not apply.
```

Deletefiles

Use the *deletefiles* option with the **archive** command to delete files from your workstation after you archive them.

You can also use this option with the **restore image** command and the *incremental* option to delete files from the restored image if they were deleted after the image was created.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──DELetefiles──────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc archive "/home/foo/*.c" –deletefiles
dsmc restore image /local/data -incremental -deletefiles
```

Description

The *description* option assigns or specifies a description for files when performing archive, delete, retrieve, or query archive operations.

For example, if you want to archive a file named budget.jan and assign to it the description **2002 Budget for Proj 1**, you would enter:

```
dsmc archive –des="2003 Budget for Proj 1" /home/plan/
proj1/budget.jan
```

Notes:
1. The maximum length of a description is 254 characters.
2. Enclose the value in quotes (" ") if the option value that you enter contains a blank space.

You can also use this option to specify the description of a backup set that you want to query.

Use the *description* option with the following commands:
- **archive**
- **delete archive**
- **query archive**
- **query backupset**
- **retrieve**

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►—DEScription =— description———————————————————————————————►◄
```

Parameters

description

Assigns a description to the file you are archiving. If you do not specify a description with the **archive** command, the default is `Archive Date:x`, where `x` is the current system date. Note that the date is always 10 characters long. If your date format uses a two digit year, there will be two blank spaces at the end of the date. For example, a default description using a four-digit year might be "`Archive Date: 2002/05/03`", and the same default with a two-digit year might be "`Archive Date: 02/05/03 `" (note the two spaces at the end). When retrieving files using the two-digit year description, you can enter the -*description* option string in either of the following ways:

```
-description="ArchiveDate: 02/05/03  "
 or
-description="ArchiveDate: 02/05/03*"
```

If you use the **archive** command to archive more than one file, the description you enter applies to each file. For example, to archive a group of files and assign the same description, *Project X*, to each file, you would enter:

```
dsmc archive –description="Project X" "/home/
allproj/.*"
```

You can then use the description to retrieve all of the files.

Examples

Command line:

```
dsmc archive "/home/foo/*.prj" -des="2003 Budget for Proj 1"
dsmc query backupset -loc=server -descr="My Laptop"
```

Detail

Use the *detail* option to display management class, file space, backup, and archive information depending on the command with which it is used.

Use the *detail* option with the **query mgmtclass** command to display detailed information about each management class in your active policy set. If you do not use the *detail* option, only the management class name and a brief description displays on the screen. If you specify the *detail* option, information about attributes in each copy group contained in each management class displays on the screen. A management class can contain a backup copy group, an archive copy group, both, or neither.

Use the *detail* option with the **delete filespace** and **query filespace** commands to determine the fsID of a file space. The fsID also appears in the file information dialog in the native and Web client GUIs.

Use the *detail* option with the **query backup** and **query archive** commands to display the last modification date and the last access date of the file you specify.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──DETail────────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:

```
dsmc query mgmtclass -detail
dsmc query filespace -detail
```

Dirmc

Authorized User

The *dirmc* option specifies the management class you want to use for directories. If you do not specify this option to associate a management class with directories, the client program uses the management class in the active policy set of your policy domain with the longest retention period. It is recommended that you select a management class for individual directories that retains directories at least as long as it retains the files associated with them.

Note: If you want to backup specific files to a management class see "Assigning a management class to files" on page 141 for more information.

If you specify a management class with this option, all directories specified in a backup operation are bound to that management class.

The *dirmc* option specifies the management class of directories you back up and does not effect archived directories. Use the *archmc* option with the **archive** command to specify the available management class for your policy domain to which you want to bind your archived directories and files. If you do not use the *archmc* option, the server binds archived directories to the default management class. If the default management class has no archive copy group, the server binds archived directories to the management class with the shortest retention period.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza. You can set this option on the **Backup** category, **Directory Management Class** section in the Preferences editor.

Syntax

```
►►──DIRMc─ mgmtclassname──────────────────────────────────►◄
```

Parameters

mgmtclassname
Specifies the name of the management class you want to associate with directories. The client uses the management class name that you specify for all directories that you back up. If you do not specify this option, the client associates the management class with the longest retention period with directories.

Examples

Options file:
```
dirm managdir
```

Command line
```
Does not apply.
```

Dirsonly

The *dirsonly* option processes directories *only*. The client does not process files.

Use the *dirsonly* option with the following commands:
- **archive**
- **incremental**
- **query archive**
- **query backup**
- **restore**
- **restore backupset**
- **retrieve**
- **selective**

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──DIrsonly───────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc query backup -dirsonly "*"
```

Domain

The *domain* option specifies the file systems that you want to include for incremental backup in your client domain.

Use the *domain* option in your client system options file (dsm.sys) or the client user options file (dsm.opt) to define your default client domain. Tivoli Storage Manager uses your default client domain in the following situations to determine which file systems to process during an incremental backup:

- When you run an incremental backup using the **incremental** command and you do not specify which file systems to process.
- When your administrator defines a schedule to run an incremental backup for you, but does not specify which file systems to process.
- When you select the **Backup Domain** action from the Tivoli Storage Manager native GUI or Web GUI .

If you do not use the *domain* option to specify file systems in your client options file, Tivoli Storage Manager uses the *all-local* parameter as the default.

Note: You can include a virtual mount point in your client domain. For information about defining a virtual mount point, see "Virtualmountpoint" on page 332.

When you use the *domain* option with the **incremental** command, Tivoli Storage Manager adds file systems that you specify to the file system defined in your client options file. For example, if you enter the following in your client options file:

```
domain /home /usr /datasave
```

and the following on the command line:

```
dsmc incremental -domain="/fs1 /fs2"
```

Tivoli Storage Manager performs an incremental backup for your /home, /usr, /datasave, /fs1, and /fs2 file systems.

If you use both a file specification and the *domain* option with the **incremental** command, Tivoli Storage Manager ignores the *domain* option and processes only those file systems that you specify in the file specification. For example, if you enter:

```
dsmc incremental /fs1 /fs2 -domain="/fs3 /fs4"
```

Tivoli Storage Manager performs an incremental backup for the /fs1 and /fs2 file systems only.

You can also exclude file systems by specifying the dash (-) operator before the file systems. For example, in the following option Tivoli Storage Manager will process all local file systems except for the /home file system:

```
domain ALL-LOCAL -/home
```

Note: You cannot use the (-) operator in front of a domain keyword such as ALL-LOCAL.

Attention: If you are running GPFS for AIX or GPFS for Linux86 in a multi-node cluster, and all nodes share a mounted GPFS file system, Tivoli Storage Manager processes this file system as a local file system. Tivoli Storage Manager backs up the file system on each node during an incremental backup. To avoid this, you can do *one* of the following:

- Explicitly configure the **domain** statement in the client user options file (dsm.opt) to list the file systems you want that node to back up.
- Set the **exclude.fs** option in the client system options file to exclude the GPFS file system from backup services.

Automounted file systems

When performing a backup with the **domain** option set to *all-local*, files handled by automounter and loopback file systems are not backed up.

If you back up a file system with the **domain** option set to *all-local*, any subdirectories that are mount points for an automounted file system (autofs) are excluded from backup. Any files that exist on the server for the automounted subdirectory are expired.

When performing a backup with the **domain** option set to *all-lofs*, all explicit loopback file systems (LOFS) are backed up and all automounted file systems are excluded. For loop devices and local file systems handled by automounter, set the **domain** option to *all-auto-lofs*.

You should use the **automount** option with the **domain** option to specify one or more automounted file systems to be mounted and added into the domain. If you specify the **automount** option, automounted file systems are remounted if they have gone offline during the execution of the **incremental** command. See "Automount" on page 171 for more information.

Virtual mount points cannot be used with automounted file systems.

For HP-UX: The **domain** option is enhanced with the new keywords *all-auto-lofs* and *all-auto-nfs* to support automounted file systems. To use this enhancement, set the *autofs* parameter to 1 in the /etc/rc.config.d/nfsconf file. Changing this parameter requires a reboot.

The following UNIX platforms support automounter, LOFS, or LOFS through automounter, as indicated:

Platform	automounter	LOFS	LOFS through automounter
AIX	yes	yes	yes
HP-UX	yes	yes	no
All Linux clients	yes	yes	yes
OS/390 UNIX	yes	no	no
Solaris	yes	yes	yes

Note: For HP-UX 11i, you must use the new automounter, AutoFS. To activate AutoFS, set the *autofs* parameter to 1 in the /etc/rc.config.d/nfsconf file. Changing this parameter requires a reboot. If you encounter problems with

NFS automounted file systems, install patches PHCO_24777 and PHNE_26388 (or later patches). For further information, refer to the HP-UX documentation.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys) or the client user options file (dsm.opt). You can set this option on the **Backup** category, **Domain for Backup** section of the Preferences editor.

Syntax

```
>>--DOMain--+--all-local---------+--><
            +--domain------------+
            +--  -domain---------+
            +--all-lofs----------+
            +--all-nfs-----------+
            +--all-auto-nfs------+
            +--all-auto-lofs-----+
```
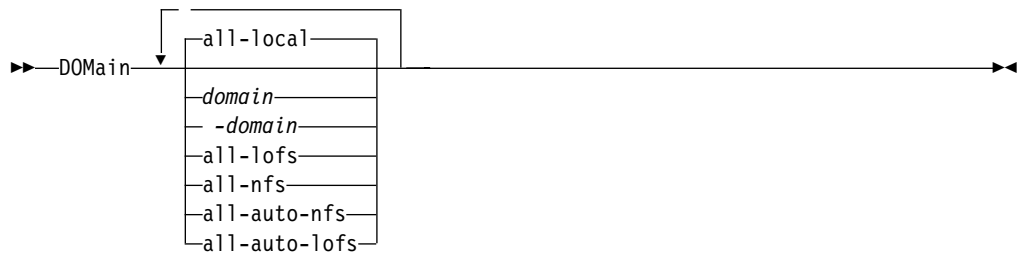
Parameters

all-**local**
Backs up all local file systems except LOFS file systems and LOFS through automounter. This is the default.

The /tmp directory is not included.

domain
Defines the file systems to include in your default client domain.

When you use *domain* with the **incremental** command, it processes these file systems in addition to those you specify in your default client domain.

-domain
Defines the file systems to exclude in your default client domain.

all-**lofs**
Backs up all loopback file systems, except those handled by automounter.

all-**nfs**
Backs up all network file systems, except those handled by automounter.

all-**auto**-**nfs**
Backs up all network file systems which are handled by automounter.

all-**auto**-**lofs**
Backs up all loop devices and local file systems which are handled through automounter.

Examples

Options file:

```
domain /tst /datasave /joe
"domain all-local"
domain ALL-LOCAL -/home
domain ALL-NFS -/mount/nfs1
```

Command line:

```
-domain="/fs1 /fs2"
-domain=/tmp
-domain="ALL-LOCAL -/home"
```

Domain.image

The *domain.image* option specifies the mounted file systems and raw logical volumes that you want to include in your client domain for an image backup. Raw logical volumes must be named explicitly.

If you do not specify a file system with the **backup image** command, the file systems you specify with the *domain.image* option are backed up.

When you specify a file system with the **backup image** command, the *domain.image* option is ignored.

If you do not use the *domain.image* option to specify file systems in your client options file, and you do not specify a file system with the **backup image** command, a message is issued and no backup occurs.

Supported Clients

This option is valid for AIX, HP-UX, Linux86, Linux IA64, Linux pSeries, Linux iSeries, Solaris *only*. The server can also define this option. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys) or dsm.opt. You can set this option on the **Backup** category → **Domain for Backup** box of the Preferences editor.

Syntax

```
►►──DOMAIN.Image─┬──────────┬──────────────────────────►◄
                 └─domain─┘
```

Parameters

domain
> Defines the file systems or raw logical volumes to include in your default client image domain.

Examples

Options file:
> domain.image /fs1 /fs2

Command line:
> Does not apply.

Domain.nas

The *domain.nas* option specifies the volumes to include in your NAS image backups. You can specify *all-nas* to include all the mounted file systems on the NAS file server, except those you exclude with the *exclude.fs.nas* option. When you use this option in your client system options file (dsm.sys), the *domain.nas* option defines your default domain for NAS image backups.

Tivoli Storage Manager uses your domain for NAS image backups when you run a **backup nas** command and you do not specify which volumes to process.

When you perform a NAS file system image backup using the **backup nas** command, Tivoli Storage Manager adds volumes that you specify on the command line to the volumes defined in your dsm.sys file. For example, if you enter the following in your dsm.sys file:

```
domain.nas nas1/vol/vol0 nas1/vol/vol1
```

and you enter the following on the command line

```
dsmc backup nas -nasnodename=nas1 /vol/vol2
```

Tivoli Storage Manager backs up the vol/vol0, vol/vol1, and vol/vol2 volumes on node nas1.

If you set the *domain.nas* option to *all-nas* in the dsm.opt file, Tivoli Storage Manager backs up all mounted volumes on the NAS file server. When performing a backup, if you use a file specification and set the *domain.nas* option to *all-nas* in the dsm.sys file, *all-nas* takes precedence.

Supported Clients

This option is valid for AIX and Solaris clients *only*. The server can also define this option.

Options File

Place this option in the client system options file (dsm.sys) or dsm.opt.

Syntax

```
>>──DOMAIN.Nas──┬──┬─all-nas─┬──┬──────────────────────────><
                │  └─domain──┘  │
                └──────◄────────┘
```

Parameters

domain
>   Defines the volumes you want to process. You cannot exclude volumes by specifying the dash (-) operator.

all-nas
>   Processes all mounted volumes on the NAS file server, except those you exclude with the *exclude.fs.nas* option. This is the default. If there is no *domain.nas* statement in the dsm.opt file and no volumes specified on the command line, Tivoli Storage Manager backs up all mounted volumes on the NAS server.

Examples

Options file:

```
domain.nas nas1/vol/vol0 nas1/vol/vol1
domain.nas all-nas
```

Command line:
Does not apply.

Editor

The *editor* option turns the command line interface (CLI) editor and retrieve capability on or off.

Because certain terminal settings result in non-standard input, the editor may not work as defined in this document. In this case, you can disable the editor by setting the *editor* option to *no* in your client system options file (dsm.sys) *or* the client user options file (dsm.opt).

Supported Clients

This option is valid for all UNIX clients (except OS/390 UNIX System Services) clients.

Options File

Place this option in the client system options file (dsm.sys) *or* the client user options file (dsm.opt).

Syntax

```
            ┌─Yes─┐
►►──EDitor──┤     ├──────────────────────────────────────►◄
            └─No──┘
```
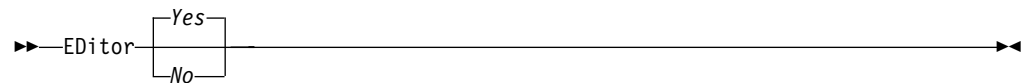
Parameters

Yes Turns on the CLI editor and command retrieve capability. This is the default.

No Turns off the CLI editor and command retrieve capability.

Note: The editor is not supported on OS/390 UNIX System Services, so the *editor* option should be set to *No.*

Examples

Options file:
　　　　editor yes

Command line:
　　　　-editor=yes

This option is valid only on the initial command line. It is not valid in interactive mode.

Enablelanfree

Authorized User

The *enablelanfree* option specifies whether to enable an available LAN-free path to a storage area network (SAN) attached storage device. A LAN-free path allows backup, restore, archive, and retrieve processing between the Tivoli Storage Manager client and the SAN-attached storage device.

To support LAN-free data movement you must install and configure the Tivoli Storage Manager Managed System for SAN Storage Agent on the client workstation. For more information, refer to the following publications:

- *IBM Tivoli Storage Manager for AIX Storage Agent User's Guide*, GC32-0771
- *IBM Tivoli Storage Manager for Sun Solaris Storage Agent User's Guide*, GC32-0781
- *IBM Tivoli Storage Manager for HP-UX Storage Agent User's Guide*, GC32-0727
- *IBM Tivoli Storage Manager for Linux Storage Agent User's Guide*, GC23-4693

Notes:

1. If you place the *enablelanfree* option in the client option file (dsm.opt), but zero (0) bytes were transferred through the SAN during an operation, ensure that you bind the data to a LAN-free enabled management class.

2. To restore backup sets in a SAN environment, see "Restore Backupset" on page 410 for more information.

To specify a communication protocol between the Tivoli Storage Manager client and Storage Agent, see "Lanfreecommmethod" on page 237 for more information.

Supported Clients

This option is valid for AIX, HP-UX, Linux86, Linux pSeries, Linux iSeries, and Solaris clients.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza. You can set this option on the **General** category → **Enable Lanfree** check box of the Preferences editor.

Syntax

```
>>──ENABLELanfree──┬─No──┬──────────────────────────────><
                   └─Yes─┘
```

Parameters

Yes   Specifies that you want to enable an available LAN-free path to a SAN-attached storage device.

No   Specifies that you do not want to enable a LAN-free path to a SAN-attached storage device. This is the default.

Examples

Options file:
```
enablelanfree yes
```

Command line:
    `-enablelanfree=yes`

This option is valid only on the initial command line. It is not valid in interactive mode.

Encryptkey

Authorized User

The *encryptkey* option specifies whether to save the encryption key password locally when performing a backup-archive operation or whether to prompt for the encryption key password. The encryption key password is saved to the TSM.PWD file in encrypted format.

If you set the *encryptkey* option to *save*, you are only prompted the first time you perform an operation. Thereafter, Tivoli Storage Manager does not prompt for the password.

The Web client saves the encryption key password in the TSM.PWD file. If you do not save the encryption key password, you are prompted for the initial encryption key password when you begin encryption processing.

You can encrypt the data that is sent to the server during a backup or archive operation using standard DES 56-bit encryption. If you use the DES 56-bit encryption feature to encrypt your data during backup or archive, you *must* have the encryption key in order to restore or retrieve the data. If the encryption key is not available on the client machine (via the *encryptkey* option) and you forgot the encryption key, then the data *cannot* be restored or retrieved under any circumstances.

Table 60 shows how both Authorized Users and non-Authorized Users can encrypt or decrypt data during a backup or restore operation depending on the value specified for the *passwordaccess* option. The TSM.PWD file must exist to perform the following Authorized User and non-Authorized User operations. The Authorized User creates the TSM.PWD file and sets the *encryptkey* option to *save* and the *passwordaccess* option to *generate*.

Note: When both encryption and compression are enabled, Tivoli Storage Manager compresses the data first, and then encrypts the data.

Table 60. Encrypting or decrypting data

Operation	Passwordaccess option	Encryptkey option	Result
Authorized user backup	generate generate prompt prompt	save prompt prompt save	data encrypted data encrypted data encrypted data not encrypted
Authorized user restore	prompt	save	prompted for encryptkey password and data decrypted
Non-Authorized User Backup	generate generate prompt prompt	prompt save prompt save	data not encrypted data encrypted data not encrypted data not encrypted
Non-authorized user restore	generate generate prompt prompt	prompt save prompt save	menu to skip or proceed data decrypted menu to skip or proceed menu to skip or proceed

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Authorization** category, **Encryption Key Password** section of the Preferences editor.

Syntax

```
           ┌─save──┐
►►──ENCryptkey──┤       ├────────────────────────────────────►◄
           └─prompt─┘
```
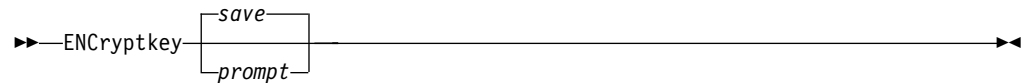
Parameters

save

Specifies that you want to save the encryption key password to a local TSM.PWD file. If you set the **encryptkey** option to *save*, you are only prompted the first time you perform an operation. Thereafter, Tivoli Storage Manager does not prompt for the password. This is the default.

prompt

Tivoli Storage Manager prompts for the password for each backup, archive, and restore operation.

Examples

Options file:

```
encryptkey prompt
```

Errorlogname

Authorized User

The *errorlogname* option specifies the fully qualified path and file name of the file in which to store information about errors that occur during processing. The value for this option overrides the DSM_LOG or DSM_DIR environment variables. The dsmwebcl.log and dsmsched.log files are created in the same directory as the error log file you specify with the *errorlogname* option.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **General** category, **Select Error Log** button of the Preferences editor.

Syntax

```
►►──ERRORLOGName─ filespec──────────────────────────────────────────────►◄
```

Parameters

filespec
> The fully qualified path and file name in which to store error log information. If any part of the path you specify does not exist, Tivoli Storage Manager attempts to create it.

> The default is the path indicated by the DSM_LOG or DSM_DIR environment variable. If DSM_LOG or DSM_DIR are not specified, the dsmerror.log file will reside in the current working directory.

> The dsmerror.log file *cannot* be a symbolic link.

Examples

Options file:
> errorlogname /tmp/tsmerror.log

Command line:
> -errorlogname=/tmp/tsmerror.log

This option is valid only on the initial command line. It is not valid in interactive mode.

Errorlogretention

Authorized User

The *errorlogretention* option specifies how many days to maintain error log entries before pruning, and whether to save the pruned entries. The error log is pruned when the first error is written to the log after a Tivoli Storage Manager session is started. If the only session you run is the client scheduler, and you run it twenty-four hours a day, the error log might not be pruned according to your expectations. Stop the session and start it again to prune the error log when the next error is written.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **General** category, **Select Error Log** button of the Preferences editor.

Syntax

```
►►──ERRORLOGRetention──┬──N────┬──┬──D──┬──────────────────────────────►◄
                       └─days──┘  └──S──┘
```
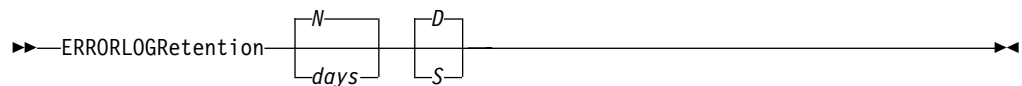
Parameters

N or *days*
> Specifies how long to wait before pruning the error log.
>
> *N*   Do not prune the error log. This permits the error log to grow indefinitely. This is the default.
>
> *days*
> > The number of days to keep log file entries before pruning the log. The range of values is zero through 9999.

D or *S*
> Specifies whether to save the pruned entries. Enter a space or comma to separate this parameter from the previous one.
>
> *D*   Discard the error log entries when you prune the log. This is the default.
>
> *S*   Save the error log entries when you prune the log.
>
> > The pruned entries are copied from the error log to the dsmerlog.pru file located in the same directory as the error log.

Examples

Options file:
> errorlogretention 400 S

Command line:
> -errorlogr=400,S

This option is valid only on the initial command line. It is not valid in interactive mode.

Exclude options

The exclude options exclude objects from backup, image, or archive services. For example, you might want to exclude all temporary files, any local caches of network files, all files that contain compiled object code that you can easily reproduce using other methods, or your operating system files.

You can exclude specific files from encryption processing during a backup.

Notes:
1. With the exception of *exclude.fs*, when you exclude a file that was previously included, existing backup versions become inactive during the next incremental backup.
2. The server can define exclude options with the *inclexcl* option.

Exclude any system files or images that could corrupt the operating system when recovered. You should also exclude the client directory containing the client files.

Attention: See "Excluding system files" on page 54 for a list of files that you should always exclude.

Use wildcard characters to exclude a broad range of files. See "Including and excluding groups of files" on page 54 for a list of wildcard characters that you can use. Then, if necessary, use the *include* option to make exceptions.

To exclude an entire directory called /any/test, enter the following:

```
exclude.dir /any/test
```

To exclude subdirectories that begin with test under the /any directory, enter the following:

```
exclude.dir /any/test*
```

Controlling symbolic link processing
Tivoli Storage Manager treats symbolic links as actual files and backs them up. However, the file referenced by the symbolic link is not backed up. In some cases symbolic links can be easily recreated and need not be backed up. In addition, backing up these symbolic links can increase backup processing time and occupy a substantial amount of space on the Tivoli Storage Manager server. You can use the *exclude.attribute.symlink* option to exclude a file or a group of files that are symbolic links from backup processing. If necessary, you can use the *include.attribute.symlink* option to include symbolic links within broad group of excluded files for backup processing. For example, to exclude all symbolic links from backup processing, except those that exist under the /home/spike directory, enter these statements in your client system options file (dsm.sys):

```
exclude.attribute.symlink  /.../*
include.attribute.symlink /home/spike/.../*
```

See "Include options" on page 231 for more information about the *include.attribute.symlink* option.

Controlling compression processing
If you want to exclude specific files or groups of files from compression processing during a backup or archive operation, consider the following:

- You must set the *compression* option to *yes* to enable compression processing. If you do not specify the *compression* option or you set the *compression* option to *no*, Tivoli Storage Manager does not perform compression processing. See "Compression" on page 181 for more information.

  If you set the *compression* option to *yes* and no *exclude.compression* statements exist, Tivoli Storage Manager considers all files for compression processing.

- Tivoli Storage Manager processes *exclude.fs, exclude.dir,* and other include-exclude statements first. Tivoli Storage Manager then considers any *exclude.compression* statements. For example, consider the following include-exclude list:

  ```
  exclude /home/jones/proj1/*.*
  exclude.compression /home/jones/proj1/file.txt
  include /home/jones/proj1/file.txt
  ```

  Tivoli Storage Manager examines the statements (reading from bottom to top) and determines that the /home/jones/proj1/file.txt file is a candidate for back up, but is not a candidate for compression processing.

- Include-exclude compression processing is valid for backup and archive processing *only*. The *exclude.compression* option does not affect whether files are excluded from backup or archive processing, only whether they are excluded from compression processing.

Processing NAS file systems

Use the *exclude.fs.nas* option to exclude file systems from NAS image backup processing.

A NAS file system specification uses the following conventions:

- NAS nodes represent a unique node type. The NAS node name uniquely identifies a NAS file server and its data to Tivoli Storage Manager. You can prefix the NAS node name to the file specification to specify the file server to which the exclude statement applies. If you do not specify a NAS node name, the file system you specify applies to all NAS file servers.
- Regardless of the client platform, NAS file system specifications use the forward slash (/) separator, as in this example: /vol/vol0.

For example, to exclude the /vol/vol1 file system of a NAS node called netappsj, specify the following exclude statement:

```
exclude.fs.nas netappsj/vol/vol1
```

To exclude /vol/vol1 from backup services on all NAS nodes, specify the following exclude statement:

```
exclude.fs.nas /vol/vol1
```

Supported Clients

This option is valid for all UNIX clients.

Options File

Place these options in the client system options file (dsm.sys). You can set these options on the **Include-Exclude** category, **Define Include-Exclude Options** section of the Preferences editor.

Syntax

```
►►──options pattern──────────────────────────────────────────►◄
```

exclude, exclude.backup, exclude.file, exclude.file.backup
> *These options are equivalent.* Use these options to exclude a file or group of files from backup services and space management services (if the HSM client is installed). The **exclude.backup** option only excludes files from normal backup, but not from HSM.

exclude.archive
> Excludes a file or a group of files that match the pattern from archive services *only*.

exclude.attribute.symlink
> Excludes a file or a group of files that are symbolic links from backup processing only.

exclude.compression
> Excludes files from compression processing if the **compression** option is set to *yes.* This option applies to backups and archives.

exclude.dir
> Excludes a directory, its files, and all its subdirectories and their files from backup processing. For example, the statement exclude.dir /test/dan/data1 excludes the /test/dan/data1 directory, its files, and all its subdirectories and their files.

exclude.encrypt
> Excludes the specified files from encryption processing. This option does not affect whether files are excluded from backup or archive processing, only whether they are excluded from encryption processing.

exclude.fs
> Excludes file spaces matching the pattern. The client does not consider the specified file space for processing and the usual deleted-file expiration process cannot occur. If you exclude a file space that was previously included, existing backup versions remain on the server subject to retention rules specified in the associated management class definition.

exclude.fs.nas
> Excludes file systems on the NAS file server from an image backup when used with the **backup nas** command. If you do not specify a NAS node name, the file system identified applies to all NAS file servers. The **backup nas** command ignores all other exclude statements including **exclude.fs** and **exclude.dir** statements. This option is for AIX and Solaris clients *only*.

exclude.image
> Excludes mounted file systems and raw logical volumes that match the pattern from image processing. This option is valid for AIX, HP-UX, Linux86, Linux IA64, Linux pSeries, Linux iSeries, Solaris *only*.

Parameters

pattern
> Specifies the file or group of files that you want to exclude. End the pattern with a file specification.

Note: For NAS file systems: You must prefix the NAS node name to the file specification to specify the file server to which the exclude statement applies. If you do not specify a NAS node name, the file system identified refers to the NAS nodename specified in the client system options file (dsm.sys) or on the command line.

If the pattern begins with a single or double quote or contains any embedded blanks or equal signs, you must surround the value in either single (') or double (") quotation marks. The opening and closing quotation marks must be the same type of quotation marks.

For the **exclude.image** option, the pattern is the name of a mounted file system or raw logical volume.

Examples

Options file:
```
exclude /unix/
exclude /.../core
exclude /home/jones/proj1/*
exclude.archive /.../core
exclude.backup /home/jones/proj1/devplan/
exclude.dir /home/jones/tmp
exclude.backup /users/home1/file1
exclude.image /usr/*/*
exclude.encrypt /users/home2/file1
exclude.compression /home/gordon/proj1/*
exclude.fs.nas netappsj/vol/vol0
exclude.attribute.symlink /.../*
```

Command line:
```
Does not apply.
```

Filelist

Use the *filelist* option with the following commands to process a list of files:
- **archive**
- **backup group**
- **delete archive**
- **expire**
- **incremental**
- **query archive**
- **query backup**
- **restore**
- **retrieve**
- **selective**

The Tivoli Storage Manager client opens the file you specify with this option and processes the list of files within according to the specific command. With the exception of the **restore** and **retrieve** commands, when you use the *filelist* option, Tivoli Storage Manager ignores all other file specifications on the command line.

The files (entries) listed in the filelist must adhere to the following rules:
- Each entry must be a fully or partially qualified path to a file or directory or a relative path.
- Each entry must be on a new line.
- Do *not* use wildcard characters.
- Each entry results in the processing of only one object (file or directory).
- If the file name contains any spaces, enclose the file name with quotes.
- Tivoli Storage Manager ignores any entry that is not valid.

The following is an example of a list of files within a filelist:

```
/home/dir/file1
/usr/tivoli/file2
/usr/avi/dir1
/fs1/dir2/file3
"/fs2/Ha Ha Ha/file.txt"
"/fs3/file.txt"
```

If an entry in the filelist indicates a directory, only that directory will process and not the files within the directory.

If the file name (the `filelistspec`) you specify with the *filelist* option does not exist, the command fails. Tivoli Storage Manager skips any entries in the filelist that are not valid files or directories. Tivoli Storage Manager logs errors and processing continues to the next entry.

Use file specifications with the **restore** and **retrieve** commands to denote the destination for the restored filelist entries. For example, in the **restore** command:

```
restore -filelist=/home/dir/file3 /usr/record/
```

the file specification /usr/record/ represents the restore destination for all entries in the filelist. However, in the **selective** command:

```
selective -filelist=/home/dir/file3 /usr/record/
```

the file specification /usr/record/ is ignored.

If you specify a directory in a filelist for the **delete archive** command, the directory is not deleted. Filelists that you use with the **delete archive** command should not include directories.

The entries in the list are processed in the order they appear in the filelist. For optimal processing performance, pre-sort the filelist by file space name and path.

Note: Tivoli Storage Manager may back up a directory twice if the following conditions exist:
- The filelist contains an entry for the directory
- The filelist contains one or more entries for files within that directory
- No backup of the directory exists

For example, your filelist includes the entries /home/dir/file1 and /home/dir. If the /dir directory does not exist on the server, the /home/dir directory is sent to the server a second time.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──FILEList =─ filelistspec──────────────────────────────────────────────►◄
```

Parameters

filelistspec
Specifies the location and name of the file that contains the list of files to process with the command.

Note: When you specify the *filelist* option on the command line, the *subdir* option is ignored.

Examples

Command line:
```
sel -filelist=/home/avi/filelist.txt
```

Filename

Use the *filename* option with the **query systeminfo** command to specify a file name in which to store information gathered from one or more of the following items:

- DSMOPTFILE - The contents of dsm.opt file.
- DSMSYSFILE - The contents of the dsm.sys file.
- ENV - Environment variables.
- ERRORLOG - The Tivoli Storage Manager error log file.
- FILE - Attributes for the file name that you specify.
- INCLEXCL - Compiles a list of include-exclude in the order in which they are processed during backup and archive operations.
- OPTIONS - Compiled options.
- OSINFO - Name and version of the client operating system (includes ULIMIT information for UNIX).
- POLICY - Policy set dump.
- SCHEDLOG - The contents of the Tivoli Storage Manager schedule log (usually dsmsched.log).
- CLUSTER - AIX cluster information.

Note: The **query systeminfo** command is intended primarily as an aid for IBM support to assist in diagnosing problems, although users who are familiar with the concepts addressed by this information may also find it useful. If you use the *console* option, no special formatting of the output is performed to accommodate screen height or width. Therefore, the console output may be difficult to read due to length and line-wrapping. In this case, it is recommended that you use the *filename* option with the **query systeminfo** command to allow the output to be written to a file that can subsequently be submitted to IBM support. See "Console" on page 183 for more information.

Supported Clients

This option is valid for all UNIX clients.

Syntax

```
►►──FILEName =─ outputfilename────────────────────────────────────►◄
```

Parameters

outputfilename
Specifies a file name in which to store the information. If you do not specify a file name, by default the information is stored in the dsminfo.txt file.

Examples

Command line:
```
query systeminfo dsmoptfile errorlog -filename=tsminfo.txt
```

Filesonly

The *filesonly* option restricts back up, restore, retrieve, or query processing to files *only*. You cannot restore or retrieve directories from the Tivoli Storage Manager server when using the *filesonly* option with the **restore** or **retrieve** commands. However, directories with default attributes are created, if required, as placeholders for files that you restore or retrieve.

You can also use the *filesonly* option with the following commands:
- **archive**
- **incremental**
- **query archive**
- **query backup**
- **restore**
- **restore backupset**
- **restore group**
- **retrieve**
- **selective**

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──FILESOnly─────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc incremental -filesonly
```

Followsymbolic

The *followsymbolic* option specifies whether you want to restore files to symbolic links or use a symbolic link as a virtual mount point. Use this option with the **restore** and **retrieve** commands, or in the client user options file (dsm.opt).

The *followsymbolic* option does not determine whether Tivoli Storage Manager follows symbolic links during backup or archive operations. During a backup operation, symbolic links are never followed. During an archive operation, you can use the *archsymlinkasfile* option to specify whether Tivoli Storage Manager follows a symbolic link and archives the file or directory it points to, or archives the symbolic link only. See "Archsymlinkasfile" on page 170 for more information about the *archsymlinkasfile* option. See "Understanding how symbolic links are handled" on page 96 for more information about how Tivoli Storage Manager handles symbolic links.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client options file (dsm.opt).

Syntax

```
            ┌─No──┐
►►──FOLlowsymbolic──┼─────┼──────────────────────────────►◄
            └─Yes─┘
```

Parameters

No   Specifies that you do not want to restore to symbolic links, or to use symbolic links as virtual mount points. This is the default.

Yes Specifies that you want to restore to symbolic links, or to use a symbolic link as a virtual mount point.

Examples

Options file:
        followsymbolic Yes

Command line:
        -fol=Yes

Fromdate

Use the *fromdate* option with the *fromtime* option to specify a date and time from which you want to search for backups or archives during a restore, retrieve, or query operation. Files that were backed up or archived before this date and time are not included, although older directories might be included, if necessary, to restore or retrieve the files.

Use the *fromdate* option with the following commands:
* **query archive**
* **query backup**
* **restore**
* **restore group**
* **restore was**
* **retrieve**

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──FROMDate =─ date──────────────────────────────────────────►◄
```

Parameters

date
> Specifies the date from which you want to search for backup copies or archived files. Enter the date in the format you selected with the *dateformat* option.
>
> When you include *dateformat* with a command, it must precede the *fromdate*, *pitdate*, and *todate* options.

Examples

Command line:
```
dsmc query backup -fromdate=12/11/2003 /home/dilbert/*
```

Fromnode

The *fromnode* option permits one node to perform commands for another node. A user on another node must use the **set access** command to permit you to query, restore, or retrieve files or images for the other node.

Use the *fromnode* option with the following commands:
- **query archive**
- **query backup**
- **query filespace**
- **query group**
- **query image**
- **query mgmtclass**
- **query was**
- **restore**
- **restore group**
- **restore image**
- **restore was**
- **retrieve**

Supported Clients

This option is valid for all UNIX clients.

Syntax

```
►►──FROMNode =─ node──────────────────────────────────────────────►◄
```

Parameters

node
   Specifies the node name on a workstation or a file server whose backup copies or archived files you want to access.

Examples

Command line:
```
dsmc query archive -fromnode=bob -subdir=yes  "/home/jones/*"
```

Fromowner

The *fromowner* option specifies an alternate owner from which to restore backup versions or archived files or images. The owner must give access to another to use the files or images. For example, to restore files from the /home/devel/proja directory belonging to *usermike* on system **puma**, and place the restored files in a directory you own named /home/id/proja, enter:

```
dsmc restore -fromowner=usermike -fromnode=puma /home/devel/proja/
/home/id/proja/
```

Non-root users can specify -*fromowner*=*root* to access files owned by the root user if the root user has granted them access.

Note: If you specify the *fromowner* option without the *fromnode* option, the active user must be on the same node as the *fromowner* user.

Use the *fromowner* option with the following commands:
- **query archive**
- **query backup**
- **query group**
- **query image**
- **query was**
- **restore**
- **restore image**
- **restore group**
- **restore was**
- **retrieve**

Supported Clients

This option is valid for all UNIX clients.

Syntax

```
►►──FROMOwner =─ owner──────────────────────────────────────────────►◄
```

Parameters

owner
    Name of an alternate owner.

Examples

Command line:
        dsmc query archive "/home/id/proja/*" -fromowner=mark

Fromtime

Use the *fromtime* option with the *fromdate* option to specify a beginning time from which you want to search for backups or archives during a restore, retrieve, or query operation. Tivoli Storage Manager ignores this option if you do not specify the *fromdate* option.

Use the *fromtime* option with the following commands:
- **query archive**
- **query backup**
- **restore**
- **restore group**
- **restore was**
- **retrieve**

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──FROMTime =─ time────────────────────────────────────────────────────►◄
```

Parameters

time
> Specifies a beginning time on a specific date from which you want to search for backed up or archived files. If you do not specify a time, the time defaults to 00:00:00. Specify the time in the format you selected with the *timeformat* option.

> When you include the *timeformat* option in a command, it must precede the *fromtime*, *pittime*, and *totime* options.

Examples

Command line:
```
dsmc q b -timeformat=4 -fromt=11:59AM -fromd=06/30/2003 -tot=11:59PM
-tod=06/30/2003 /home/*
```

Groupname

Use the ***groupname*** option with the **backup group** command to specify the name for a group. You can only perform operations on new groups or the current active version of the group.

Supported Clients

This option is valid for all UNIX clients.

Syntax

►►──GROUPName =─ *name*──►◄

Parameters

name
Specifies the name of the group which will contain the files backed up using the ***filelist*** option. Directory delimiters are not allowed in the group name since the group name is not a file specification, but a name field.

Examples

Command line:

```
backup group -filelist=/home/dir1/filelist1 -groupname=group1
-virtualfsname=/virtfs -mode=full
```

Groups

Authorized User

The ***groups*** option specifies UNIX system groups on your workstation that you want to authorize to request Tivoli Storage Manager services from the server. You can use the ***groups*** option more than once to specify several group names.

If you do not specify group names with the ***groups*** option, or user IDs with the ***users*** option, *all* users can request Tivoli Storage Manager services. If you use both the ***groups*** option and the ***users*** option, only users specified with these options can request Tivoli Storage Manager services. A root user is always authorized to request services.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza.

Syntax

Parameters

groupname
Specifies the name of a group you want to authorize to request Tivoli Storage Manager services.

Examples

Options file:

```
groups dsmcdev group1 test1 test2 design1
groups endicott almaden qadev qadev1 tools23
```

Command line:

```
Does not apply.
```

Guitreeviewafterbackup

The *guitreeviewafterbackup* option specifies whether the client returns to the Backup, Restore, Archive, or Retrieve window after a successful operation completes.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt) *or* the client system options file (dsm.sys). You can set this option on the **General** category, **Return to tree window after function completed** check box of the Preferences editor.

Syntax

```
►►──GUITREEViewafterbackup──┬─No──┬──────────────────────────►◄
                            └─Yes─┘
```
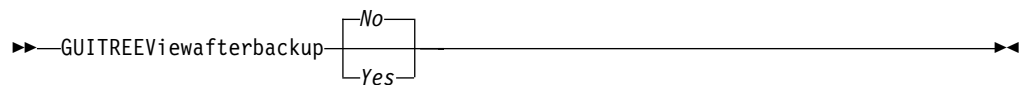
Parameters

No   Returns you to the Tivoli Storage Manager main window after a successful operation completes. This is the default.

Yes Returns you to the Backup, Restore, Archive, or Retrieve window after a successful operation completes.

Examples

Options file:
          guitreeviewafterbackup yes

Command line:
          Does not apply.

Httpport

Authorized User

The *httpport* option specifies a TCP/IP port address for the Web client.

Notes:

1. See "Configuring Tivoli Storage Manager client/server communication across a firewall" on page 45 for information about using the *httpport* option to allow the Web client to communicate with remote workstations across a firewall.

2. The Tivoli Storage Manager client API does not support this option.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Web Client** category → **HTTP Port** field of the Preferences editor.

Syntax

►►──HTTPport─ *port_address*───────────────────────────────────────►◄

Parameters

port_address
   Specifies the TCP/IP port address that is used to communicate with the Web client. The range of values is 1000 through 32767; the default is 1581.

Examples

Options file:
   httpport 1502

Command line:
   Does not apply.

Ifnewer

The *ifnewer* option replaces an existing file with the latest backup version only if the backup version is newer than the existing file. Only active backups are considered unless you also use the *inactive* or *latest* options.

Use the *ifnewer* option with the following commands:
- **restore**
- **restore backupset**
- **restore group**
- **restore was**
- **retrieve**

Note: This option is ignored if the *replace* option is set to *No.*

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──IFNewer──────────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc restore "/home/grover/*" -sub=y -rep=y -ifnewer
```

Imagetofile

Use the *imagetofile* option with the **restore image** command to specify that you want to restore the source image to a file. You may need to restore the image to a file if bad sectors are present on the target volume, or if you want to manipulate the image data. Later, you can use a 'dd' utility (available on Unix) or its equivalent to copy data from this file to a logical volume.

Supported Clients

This option is valid for AIX, HP-UX, Linux86, Linux IA64, Linux pSeries, Linux iSeries, and Solaris *only*. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──IMAGETOfile───────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc restore image /usr /home/usr.img -imagetofile
```

Imagetype

Authorized User

Use the *imagetype* option with the **backup image** command or the *include.image* option to specify the type of image backup you want to perform.

Place the *include.image* statement containing the *imagetype* value in your client system options file dsm.sys.

Supported Clients

This option is valid for AIX, Solaris, HP-UX, Linux86, Linux IA64, Linux pSeries, and Linux iSeries clients *only*. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Include-Exclude** category of the Preferences editor.

Syntax

```
►►──IMAGETYpe──=value────────────────────────────────────────►◄
```

Parameters

value
> Specifies one of the following values:

> **snapshot**
>> Specifies that you want to perform an snapshot image backup during which the volume is available to other system applications. This is the default for file systems residing on a logical volume created by the Linux Logical Volume Manager. Valid for Linux86 and Linux IA64 clients *only*.

> **dynamic**
>> Replaces the dependency on the copy serialization value in the management class to perform an image backup without unmounting and remounting the file system read-only. Use this option only if the volume cannot be unmounted and remounted read-only. Tivoli Storage Manager backs up the volume *as is* without remounting it read-only. Corruption of the backup may occur if applications write to the volume while the backup is in progress. In this case, run **fsck** after a restore. This option is valid for AIX, Solaris, HP-UX, Linux86, Linux IA64, Linux pSeries, and Linux iSeries.

> **static**
>> Replaces the dependency on the copy serialization value in the management class. Specifies that you want to perform an image backup during which the volume is unmounted and remounted read-only. This is the default for AIX, HP-UX, and Solaris. This option is valid for AIX, Solaris, HP-UX, Linux86, Linux IA64, Linux pSeries, and Linux iSeries.

Examples

Options file:
```
include.image /home MYMC imagetype=static
```

Command line:
```
-imagetype=static
```

Inactive

Use the *inactive* option and the *pick* option with the following commands to display both active and inactive objects:

- **delete group**
- **query backup**
- **query group**
- **query image**
- **query nas**
- **query was**
- **restore**
- **restore group**
- **restore image**
- **restore nas**
- **restore was**

You can also use the *pick* option to display backup versions, archive copies, and images that match the file specification you enter.

Only active backups are considered unless you also use either the *inactive* or the *latest* option.

When using the *inactive* option during a restore operation, it is recommended that you also use the *pick* or some other filtering option such as *pitdate* because, unlike the -*latest* option, it is indeterminate which version of the file will actually be restored.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

►►──INActive──►◄

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc restore "/home/zoe/*" -inactive -pick
```

Inclexcl

Authorized User

The *inclexcl* option specifies the path and file name of an include-exclude options file.

Multiple inclexcl statements are permitted. However, you must specify this option for each include-exclude file.

Ensure that you store your include-exclude options file in a directory to which all users have read access, such as /etc.

When processing occurs, the include-exclude statements within the include-exclude file are placed in the list position occupied by the *inclexcl* option, in the same order, and processed accordingly.

If you have the HSM client installed on your workstation, you can use an include-exclude options file to exclude files from backup and space management, from backup only or from space management only.

For more information about creating an include-exclude options file, see "Creating an include-exclude list (optional root user or authorized user task)" on page 50.

Supported Clients

This option is valid for all all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza. You can set this option on the **Include-Exclude** category of the Preferences editor.

Syntax

```
►►──INCLExcl─ filespec─────────────────────────────────────────────►◄
```

Parameters

filespec
   Specifies the path and file name of *one* include-exclude options file.

Examples

Options file:
```
inclexcl /usr/dsm/backup.excl
inclexcl /etc/inclexcl.def
```

Command line:
```
Does not apply.
```

Include options

The include options specify one of the following:

- Objects within a broad group of excluded objects that you want to include for backup, archive, image, and space management services, if you have the HSM client installed.
- Files that are included for backup or archive processing that you want to include for encryption processing.
- Files that are included for backup or archive processing that you also want to include that you want to include for compression processing.
- Objects to which you want to assign a specific management class and a management class name.
- A management class to assign to all objects to which you do not explicitly assign a management class.

If you do not assign a specific management class to objects, Tivoli Storage Manager uses the default management class in the active policy set of your policy domain. Use the **query mgmtclass** command to display information about the management classes available in your active policy set.

Notes:
1. The *exclude.fs* and *exclude.dir* statements override all include statements that match the pattern.
2. The server can also define these options with the *inclexcl* option.

Controlling symbolic link processing

Tivoli Storage Manager treats symbolic links as actual files and backs them up. However, the file referenced by the symbolic link is not backed up. In some cases symbolic links can be easily recreated and need not be backed up. In addition, backing up these symbolic links can increase backup processing time and occupy a substantial amount of space on the Tivoli Storage Manager server. You can use the *exclude.attribute.symlink* option to exclude a file or a group of files that are symbolic links from backup processing. If necessary, you can use the *include.attribute.symlink* option to include symbolic links within broad group of excluded files for backup processing. For example, to exclude all symbolic links from backup processing, except those that exist under the /home/spike directory, enter these statements in your client system options file (dsm.sys):

```
exclude.attribute.symlink  /.../*
include.attribute.symlink /home/spike/.../*
```

See "Exclude options" on page 208 for more information about the *exclude.attribute.symlink* option.

Compression and encryption processing

If you want to include specific files or groups of files for compression and encryption processing during a backup or archive operation, consider the following:

- You must set the *compression* option to *yes* to enable compression processing. If you do not specify the *compression* option or you set the *compression* option to *no*, Tivoli Storage Manager does not perform compression processing. See "Compression" on page 181 for more information.

- Tivoli Storage Manager processes *exclude.fs, exclude.dir,* and other include-exclude statements first. Tivoli Storage Manager then considers any *include.compression* and *include.encryption* statements. For example, consider the following include-exclude list:

```
exclude /home/jones/proj1/file.txt
include.compression /home/jones/proj1/file.txt
include.encryption /home/jones/proj1/file.txt
```

  Tivoli Storage Manager examines the `exclude /home/jones/proj1/file.txt` statement first and determines that /home/jones/proj1/file.txt is excluded from backup processing and is, therefore, not a candidate for compression and encryption processing.
- Include-exclude compression and encryption processing is valid for backup and archive processing *only*.

Processing NAS file systems

Use the *include.fs.nas* option to bind a management class to NAS file systems and to control if Table of Contents information is saved for the file system backup.

A NAS file system specification uses the following conventions:
- NAS nodes represent a new node type. The NAS node name uniquely identifies a NAS file server and its data to Tivoli Storage Manager. You can prefix the NAS node name to the file specification to specify the file server to which the include statement applies. If you do not specify a NAS node name, the file system you specify applies to all NAS file servers.
- Regardless of the client platform, NAS file system specifications use the forward slash (/) separator, as in this example: /vol/vol0.

Use the following syntax:

►►──*pattern*─ *mgmtclassname*─ *toc=value*──────────────────────────────────────►◄

Parameters

pattern
  Specifies the objects to include for backup services, to assign a specific management class, or to control TOC creation. You can use wildcards in the pattern.

mgmtclassname
  Specifies the name of the management class to assign to the objects. If a management class is not specified, the default management class is used.

toc=value
  See "Toc" on page 321 for more information.

For example, to assign a management class to the /vol/vol1 file system of a NAS node called netappsj, specify the following include statement:

```
include.fs.nas netappsj/vol/vol1 nasMgmtClass toc=yes
```

Processing WebSphere Application Server (WAS) file systems

You can use the *include* option in your client system options file (dsm.sys) to assign a management class to a WAS group backup. For example:
- For the Network Deployment Manager: `include /WAS_ND_NDNODE mgmtclass`
- For the Application Server: `include /WAS_APPNODE mgmtclass`

See "Creating an include-exclude list (optional root user or authorized user task)" on page 50 for more information.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place these options in the client system options file (dsm.sys). You can set these options on the **Include**-**Exclude** category, **Define Include**-**Exclude Options** section of the Preferences editor.

Syntax

```
►►──options pattern ─┬──────────────────┬──────────────────────────────►◄
                     └─ mgmtclassname ──┘
```

include, include.backup, include.file
These options are equivalent. Use these options to include files or assign management classes for backup processing.

include.archive
Includes files or assigns management classes for archive processing.

include.attribute.symlink
Includes a file or a group of files that are symbolic links within broad group of excluded files for backup processing only.

include.compression
Includes files for compression processing if you set the ***compression*** option to *yes.* This option applies to backups and archives.

include.encrypt
Includes the specified files for encryption processing. By default, Tivoli Storage Manager does not perform encryption processing.

include.fs.nas
Use the ***include.fs.nas*** option to bind a management class to Network Attached Storage (NAS) file systems. You can also specify whether Tivoli Storage Manager saves Table of Contents (TOC) information during a NAS file system image backup, using the ***toc*** option with the ***include.fs.nas*** option in your client system options file (dsm.sys). See "Toc" on page 321 for more information. This option is valid for AIX and Solaris clients *only.*

include.image
Includes a file space or logical volume, or assigns a management class when used with the **backup image** command. The **backup image** command ignores all other include options.

You can use the ***imagetype*** option with the **backup image** command or the ***include.image*** option to specify whether to perform a static, dynamic, or snapshot (Linux86 and Linux IA64 only) image backup.

For Linux86 and Linux IA64 clients: Use the ***snapshotcachesize*** option with the **backup image** command, in the dsm.opt file, or with the ***include.image*** option to specify an appropriate snapshot size so that all old data blocks can be stored while the image backup occurs. A snapshot size of 100 percent will ensure a valid snapshot. See "Snapshotcachesize" on page 303 for more information.

This option is valid for AIX, HP-UX, Solaris, Linux86, Linux IA64, Linux pSeries, and Linux iSeries.

Parameters

pattern
   Specifies the objects to include for backup or archive processing or to assign a specific management class. End the pattern with a file specification.

   Note: For NAS file systems: You must prefix the NAS node name to the file specification to specify the file server to which the include statement applies. If you do not specify a NAS node name, the file system identified refers to the NAS node name specified in the client system options file (dsm.sys) or on the command line.

   If the pattern begins with a single or double quote or contains any embedded blanks or equal signs, you must surround the value in either single (') or double (″) quotation marks. The opening and closing quotation marks must be the same type of quotation marks.

   For the *include.image* option, the pattern is the name of a mounted file system or raw logical volume.

mgmtclassname
   Specifies the name of the management class to assign to the objects. If a management class is not specified, the default management class is used.

Examples

Options file:

```
include /home/proj/text/devel.*
include /home/proj/text/* textfiles
include * managall
include /WAS_ND_NDNODE mgmtclass
include /WAS_APPNODE mgmtclass
include.image /home/*/*
include.archive /home/proj/text/* myarchiveclass
include.backup /home/proj/text/* mybackupclass
include.compression /home/proj/text/devel.*
include.encrypt /home/proj/gordon/*
include.fs.nas netappsj/vol/vol0 homemgmtclass
include.image /home MGMTCLASSNAME type=snapshot snapshotcachesize=40
include.image /home imagetype=static
include.image /home imagetype=snapshot
include.image /home MGMTCLASSNAME imagetype=static
include.attribute.symlink /home/spike/.../*
```

Command line:

```
Does not apply.
```

Incrbydate

Use the *incrbydate* option with the **incremental** command to back up new and changed files with a modification date later than the last incremental backup stored at the server, unless you exclude the file from backup. Files added at the client after the last incremental backup, but with a modification date earlier than the last incremental, are not backed up.

An incremental-by-date updates the date and time of the last incremental at the server. If you perform an incremental-by-date on only part of a file system, the date of the last full incremental is not updated and the next incremental-by-date will back up these files again.

Both full incrementals and incrementals-by-date back up new and changed files. An incremental-by-date takes less time to process than a full incremental and requires less memory. However, unlike a full incremental, an incremental-by-date does not maintain current server storage of *all* your workstation files because:

- It does not expire backup versions of files that are deleted from the workstation.
- It does not rebind backup versions to a new management class if the management class has changed.
- It does not back up files with attributes that have changed unless the modification dates and times have also changed, such as Access control list (ACL) data.
- It ignores the copy group frequency attribute of management classes.

Note: If you have limited time during the week to perform backups, but extra time on weekends, you can maintain current server storage of your workstation files by performing an incremental backup with the *incrbydate* option on weekdays and a full incremental backup on weekends.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──INCRbydate──────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc incremental -incrbydate
```

Incremental

Use the *incremental* option with the **restore image** command to ensure that any changes that were made to the base image are also applied to the restored image.

If you also use the *deletefiles* option, changes include the deletion of files and directories that were in the original image but later deleted from the workstation.

Supported Clients

This option is valid for AIX, HP-UX, Linux86, Linux IA64, Linux pSeries, Linux iSeries, and Solaris *only*. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──INCREmental──────────────────────────────────────────────────►◄
```

Examples

Command line:
```
res i "/home/devel/projecta/*" -incremental
```

Lanfreecommmethod

Authorized User

The **lanfreecommmethod** option specifies the communications protocol between the Tivoli Storage Manager client and Storage Agent. This enables processing between the client and the SAN-attached storage device.

For AIX and HP-UX: Use the **lanfreeshmport** to specify the Shared Memory port number where the Storage Agent is listening. See "Lanfreeshmport" on page 239 for more information

Supported Clients

This option is valid for AIX, HP-UX, Linux86, Linux pSeries, Linux iSeries, and Solaris clients *only*.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza.

Syntax

```
►►──LANFREECommmethod─ commmethod──────────────────────────────────────►◄
```

Parameters

commmethod
Specifies the supported protocol for your Tivoli Storage Manager client:

TCPip
The Transmission Control Protocol/Internet Protocol (TCP/IP) communication method.

Use the **lanfreetcpport** option to specify the TCP/IP port number where the Storage Agent is listening. See "Lanfreetcpport" on page 240 for more information. For AIX and HP-UX *root* and *non-root* users, the TCP/IP communication method is the default. AIX and HP-UX *non-root* users can only use the TCP/IP communication method. Solaris *root* and *non-root* users can only use the TCP/IP communication method.

SHAREdmem
Use the Shared Memory communication method when the client and Storage Agent are running on the same system. Shared Memory provides better performance than the TCP/IP protocol. This is the default communication method for AIX and HP-UX *root* users. When specifying this communications method on AIX, the backup-archive client user must be logged in as root or have the same user ID as the process running the Storage Agent. AIX and HP-UX *non-root* users must use the default TCP/IP communication method and cannot use the Shared Memory communication method. See "Commmethod" on page 177 for logon restrictions when using this communication method.

Examples

Options file:
```
lanfreec tcp
```

Command line:
```
-lanfreec=tcp
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Lanfreeshmport

Authorized User

The *lanfreeshmport* option specifies the Shared Memory port number where the Tivoli Storage Manager Storage Agent is listening. This option is valid for AIX and Solaris clients *only*.

Use this option when *lanfreecommmethod*=*SHAREdmem* is specified for communication between the Tivoli Storage Manager client and Storage Agent. This enables processing between the client and the SAN-attached storage device. See "Lanfreecommmethod" on page 237 for more information about the *lanfreecommmethod* option.

Supported Clients

This option is valid for AIX and HP-UX clients *only*.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza.

Syntax

►►──LANFREEShmport─ *port_address*───────────────────────────────────────►◄

Parameters

port_address
> Specifies the Shared Memory port number where the Storage Agent is listening. The range of values is 1000 through 32767; the default is 1510.

Examples

Options file:
> lanfrees 1520

Command line:
> -lanfrees=1520

This option is valid only on the initial command line. It is not valid in interactive mode.

Lanfreetcpport

Authorized User

The *lanfreetcpport* option specifies the TCP/IP port number where the Tivoli Storage Manager Storage Agent is listening.

Use this option when you specify *lanfreecommmethod*=*TCPip* for communication between the Tivoli Storage Manager client and Storage Agent. Do not specify the *lanfreetcpport* option if you want to use the NAMedpipes communication method for LAN-free communication. See "Lanfreecommmethod" on page 237 for more information about the *lanfreecommmethod* option.

Supported Clients

This option is valid for AIX, HP-UX, Linux86, Linux pSeries, Linux iSeries, and Solaris clients *only*.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza.

Syntax

```
►►──LANFREETCPport─ port_address───────────────────────────────────►◄
```

Parameters

port_address
> Specifies the TCP/IP port number where the Storage Agent is listening. The range of values is 1000 through 32767; the default is 1500.

> **Note:** The client *lanfreetcport* value must match Storage Agent *tcpport* value for communications with the Storage Agent (virtual server). The client *tcpport* value must match the server *tcpport* value for communications with the actual server.

Examples

Options file:
```
lanfreetcp 1520
```

Command line:
```
-lanfreetcp=1520
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Largecommbuffers

Authorized User

The *largecommbuffers* option specifies whether the client uses increased buffers to transfer large amounts of data between the client and the server. You can disable this option when your workstation is running low on memory.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

```
           ┌─No──┐
►►──LARGECOMmbuffers──┤     ├────────────────────────►◄
           └─Yes─┘
```

Parameters

No   Specifies that increased buffers *are not* used to transfer large amounts of data to the server. This is the default. For AIX, the default is *Yes*.

Yes Specifies that increased buffers *are* used to transfer large amounts of data to the server. On AIX the buffer is increased to 256KB which matches the server buffer, allowing increased performance. This is the default for AIX *only*.

Examples

Options file:
        largecommbuffers yes

Command line:
        -largecommbuffers=yes

This option is valid only on the initial command line. It is not valid in interactive mode.

Latest

Use the *latest* option with the following commands to restore the most recent backup version of a file, even if the backup is inactive:
- **restore**
- **restore group**
- **restore was**

Only active versions are considered for a restore unless you use either the *inactive* or the *latest* option.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──LATest─────────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc restore "/home/devel/projecta/*" -latest
```

Localbackupset

The *localbackupset* option specifies whether the Tivoli Storage Manager GUI bypasses initial logon with the Tivoli Storage Manager server to restore a local backup set on a standalone workstation. You can use this option on the command line or place it your client options file (`dsm.opt`).

If you set the *localbackupset* option to *yes*, the GUI does not attempt initial logon with the server. In this case, the GUI only enables the restore functionality.

If you set the *localbackupset* option to *no* (the default), the GUI attempts initial logon with the server and enables all GUI functions.

To start the GUI and bypass the initial logon with the server to restore a local backup set on a standalone workstation, enter:

```
dsm -localbackupset=yes
```

Note: The **restore backupset** command supports restore of local backup sets on a standalone workstation *without* using the *localbackupset* option. See "Restore Backupset" on page 410 for more information.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt) or the client system options file (dsm.sys) file.

Syntax

```
►►──LOCALbackupset─┬──No──┬──────────────────────────────────►◄
                   └──Yes─┘
```

Parameters

No   Specifies that the GUI attempts initial logon with the server and enables all functions. This is the default.

Yes Specifies that the GUI does not attempt initial logon with the server and enables only the restore functionality.

Examples

Options file:
```
localbackupset yes
```

Command line:
```
dsm -localbackupset=yes
```

This option is not valid with the **dsmc** command line client.

Location

The *location* option specifies where Tivoli Storage Manager searches for a backup set during a query or restore operation. You can use this option to locate backup sets on the server or local files. Tapes that are generated on the server can be used locally by specifying the *location* option and either the file name or the tape device.

Use the *location* option with the **query backupset** and **restore backupset** commands.

Notes:

1. If you use the **restore backupset** command on the initial command line and you set the *location* option to *tape* or *file*, no attempt is made to contact the server.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──LOCation =──┬──server──┬──────────────────────────────────────►◄
                ├──file────┤
                └──tape────┘
```

Parameters

server
    Specifies that Tivoli Storage Manager searches for the backup set on the server. This is the default.

file Specifies that Tivoli Storage Manager searches for the backup set on a local file.

tape
    Specifies that Tivoli Storage Manager searches for the backup set on a local tape device. It is no longer necessary to specify a specific tape device type name. Specifying *location*=*tape* covers all tape device types. This parameter is valid for Solaris, AIX, and HP-UX clients.

    Note: For Solaris, AIX, HP-UX, and Solaris If you want to restore a backup set from a 3570 or 3590 tape device, but you do not have the 3570 or 3590 generic device driver on your client workstation, you can download these device drivers from the following Web site:

```
ftp://ftp.software.ibm.com/storage/devdrvr/
```

    For Solaris: Use tapes that are fully compliant with Sun standards.

Examples

Command line:

```
restore backupset "/dev/rmt0" -loc=tape
restore backupset mybackupsetname -loc=server
restore backupset /home/budget/backupsetfile.name -loc=file
```

Makesparsefile

Use the *makesparsefile* option with the **restore** or **retrieve** commands to specify how sparse files are recreated. Sparse files do not have disk space allocated for every block in the whole address space, leading to holes within the file. The Tivoli Storage Manager client detects sparse files during a backup operation and marks them as sparse on the Tivoli Storage Manager server. Holes are detected by their content, which is always zeros.

If you set the *makesparsefile* option to *yes* (default), holes within the file are not written to disk so no additional disk space is allocated during a restore.

If you set the *makesparsefile* option to *no*, holes are not recreated, leading to disk blocks allocated for the whole address space. This might result in a larger amount of used disk space. Ensure that you have enough disk space to restore all data.

On some UNIX systems, it may be necessary to back up system specific files as non-sparse files. Use the *makesparsefile* option for files where the existence of physical disk blocks is required, such as ufsboot on Solaris, which is executed during boot time. The boot file loader of the operating system accesses physical disk blocks directly and does not support sparse files.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

```
            ┌─Yes─┐
►►──MAKesparsefile──┤     ├──────────────────────────────►◄
            └─No──┘
```

Parameters

Yes Specifies that holes within the file are not written so that no additional disk space is allocated during a restore. This is the default.

No Specifies that holes are not recreated leading to disk blocks allocated for the whole address space.

Examples

Options file:
    makesparsefile no

Command line:
    -makesparsefile=no

Mailprog

Authorized User

The ***mailprog*** option specifies the program and user ID to which you want to send a newly-generated password when the old password expires. Use this option only when you set the ***passwordaccess*** option to *generate*.

Supported Clients

This option is for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza.

Syntax

```
►►──MAILprog filespec userid───────────────────────────────────────────►◄
```

Parameters

filespec
Specifies the path and file name of the program to which you want to send a newly-generated password. The program you specify must accept standard output.

userid
Specifies the user ID of the user to whom you want to send a newly-generated password. For OS/390 UNIX System Services, enter the user ID in uppercase letters.

Examples

Options file:

```
mailprog /usr/bin/xsend root (for AIX)
mailprog /bin/mailx USER1 (for OS/390 UNIX System Services)
```

Note: Run the **enroll** command before you use *xsend*.

Command line:

```
Does not apply.
```

Managedservices

Authorized User

The *managedservices* option specifies whether the Tivoli Storage Manager Client Acceptor daemon (CAD) manages the scheduler, the Web client, or both.

See "Configuring the client scheduler" on page 44 for instructions to set up the CAD to manage the scheduler.

The CAD serves as an external timer for the scheduler. When the scheduler is started, it queries the server for the next scheduled event. The event is either executed immediately or the scheduler exits. The CAD restarts the scheduler when it is time to execute the scheduled event.

Notes:

1. If you set the *schedmode* option to *prompt*, the server prompts the CAD when it is time to run the schedule. The scheduler will connect and disconnect to the server when the CAD is first started.

2. Set the *passwordaccess* option to *generate* in your client system options (dsm.sys) and generate a password, so Tivoli Storage Manager can manage your password automatically. See "Passwordaccess" on page 264 for more information.

Using the CAD to manage the scheduler service can provide the following benefits:

- Memory retention problems that may occur when using traditional methods of running the scheduler are resolved. Using the CAD to manage the scheduler requires very little memory between scheduled operations.
- The CAD can manage both the scheduler program and the Web client, reducing the number of background processes on your workstation.
- By default, if you do not specify the *managedservices* option, the CAD manages the Web client to provide backward compatibility.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza. You can set this option on the **Web Client** of the Preferences editor.

Syntax

```
►►──MANAGEDServices─────────────────────────────────────────►◄
                      │                    │
                      └──▼──mode──┘
```
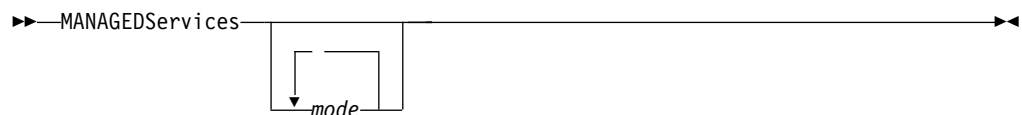
Parameters

mode
    Specifies whether the CAD manages the scheduler, the Web client, or both.

webclient
> Specifies that the CAD manages the Web client. This is the default.

schedule
> Specifies that the CAD manages the scheduler.

Examples

Options file:
> The following are examples of how you might specify the ***managedservices*** option in your client system options file (dsm.sys).

> **Task**   Specify that the CAD manages the Web client *only*.
> ```
> managedservices webclient
> ```

> **Task**   Specify that the CAD manages the scheduler *only*.
> ```
> managedservices schedule
> ```

> **Task**   Specify that the CAD manages both the Web client and the scheduler.
> ```
> managedservices schedule webclient
> ```

> **Note:** The order in which these values are specified is not important.

Command line:
> Does not apply.

Maxcmdretries

Authorized User

The *maxcmdretries* option specifies the maximum number of times the client scheduler (on your workstation) attempts to process a scheduled command that fails. The command retry starts *only if* the client scheduler has not yet backed up a file, never connected to the server, or failed before backing up a file. This option is only used when the scheduler is running.

Your Tivoli Storage Manager administrator can also set this option. If your Tivoli Storage Manager administrator specifies a value for this option, that value overrides what you specify in the client options file *after* your client node successfully contacts the server.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Scheduler** category, **Maximum command retries** field of the Preferences editor.

Syntax

►►──MAXCMDRetries─ *maxcmdretries* ─────────────────────────────────────►◄

Parameters

maxcmdretries
> Specifies the number of times the client scheduler can attempt to process a scheduled command that fails. The range of values is zero through 9999; the default is 2.

Examples

Options file:
> maxcmdr 4

Command line:
> -maxcmdretries=4

This option is valid only on the initial command line. It is not valid in interactive mode.

Memoryefficientbackup

The *memoryefficientbackup* option specifies a memory-conserving algorithm for processing incremental backups, that backs up one directory at a time, using less memory. Use this option with the **incremental** command when your workstation is memory constrained.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option.

Options File

Place this option in the client user options file (dsm.opt). You can set this option on the **Backup** category, **Use memory-saving algorithm** checkbox of the Preferences editor.

Syntax

```
►►──MEMORYEFficientbackup──┬─No──┬─────────────────────────────►◄
                           └─Yes─┘
```

Parameters

No   Your client node uses the faster, more memory-intensive method when processing incremental backups. This is the default.

Yes Your client node uses the method that requires less memory when processing incremental backups.

Examples

Options file:
    memoryefficientbackup yes

Command line:
    -memoryef=no

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file unless overridden by the initial command line or by an option forced by the server.

Mode

Use the ***mode*** option with these commands, as follows:

backup image
> To specify whether to perform a selective or incremental image backup of client file systems.

backup nas
> To specify whether to perform a full or differential image backup of NAS file systems.

backup was
> To specify whether to perform a full or differential backup of the WebSphere Application Server (WAS) Network Deployment Manager (contains setup, application files, and configuration information) or the Application Server (also contains setup, application files, and configuration information) to the Tivoli Storage Manager server.

backup group
> To specify whether to perform a full or differential group backup containing a list of files from one or more file space origins.

The ***mode*** option has no effect on a raw logical device backup.

Supported Clients

This option is valid for AIX, HP-UX, Linux86, Linux IA64, Linux pSeries, Linux iSeries, and Solaris *only*. The Tivoli Storage Manager client API does not support this option.

Syntax

For image backup of client file systems (AIX, Solaris, HP-UX, Linux86, Linux IA64, Linux pSeries, and Linux iSeries)

```
                 ┌─Selective──┐
►►──MODE =───────┤            ├──────────────────────────────────────►◄
                 └─Incremental─┘
```

For image backup of NAS file systems (AIX and Solaris)

```
                 ┌─differential─┐
►►──MODE =───────┤              ├────────────────────────────────────►◄
                 └─full─────────┘
```

For group and WAS backups (AIX, Solaris, Linux86)

```
                 ┌─full─────────┐
►►──MODE =───────┤              ├────────────────────────────────────►◄
                 └─differential─┘
```

Parameters

selective
> Specifies that you want to perform a full (selective) image backup. This is the default for image backup of client file systems.

incremental
> Specifies that you want to back up only new and changed files after the last full image backup. Deleted files are not inactivated on the server.

full
> Specifies that you want to perform a full backup of NAS, WAS, or group objects. This is the default for WAS and group backups.

differential
> Specifies that you want to perform a NAS, WAS, or group backup of files that changed since the last full backup. If an eligible full backup does not exist, a full backup occurs. This is the default for NAS objects.

Examples

Task   Perform the NAS image backup of the entire file system.

> **Command:** `dsmc backup nas -mode=full -nasnodename=nas1 /vol/vol0 /vol/vol1`

Task   Back up the /home/test file space using an image incremental backup that backs up only new and changed files after the last full image backup.

> **Command:** `dsmc backup image /home/test -mode=incremental`

Task   Perform a full backup of all the files in filelist /home/dir1/filelist1 to the virtual file space name /virtfs containing the group leader /home/group1 file.

> **Command:**
>
> ```
> backup group -filelist=/home/dir1/filelist1 -groupname=group1
> -virtualfsname=/virtfs -mode=full
> ```

Monitor

The *monitor* option specifies whether to monitor an image backup or restore of file systems belonging to a Network Attached Storage (NAS) file server.

If you specify *monitor*=*yes*, Tivoli Storage Manager monitors the current NAS image backup or restore operation and displays processing information on your screen. This is the default.

If you specify *monitor*=*no*, Tivoli Storage Manager does not monitor the current NAS image backup or restore operation and is available to process the next command.

Use this option with the **backup nas** or **restore nas** commands.

Supported Clients

This option is valid for AIX and Solaris clients *only*.

Syntax

```
►►──MONitor =──┬─Yes─┬──────────────────────────────────►◄
               └─No──┘
```
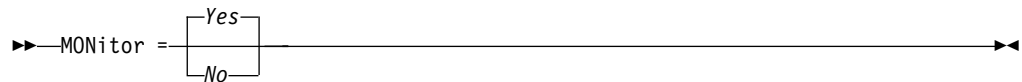
Parameters

Yes Specifies that you want to monitor the current NAS image backup or restore operation and display processing information on your screen. This is the default.

No Specifies that you do not want to monitor the current NAS image backup or restore operation.

Examples

Command line:
```
backup nas -mode=full -nasnodename=nas1 -monitor=yes
/vol/vol0 /vol/vol1
```

Nasnodename

The *nasnodename* option specifies the node name for the NAS file server when processing NAS file systems. The node name identifies the NAS file server to the Tivoli Storage Manager server. The server must register the NAS file server.

You can specify this option on the command line or in the client system options file (dsm.sys).

You can override the default value in the dsm.sys file by entering a different value on the command line. If you do not specify the *nasnodename* option in the dsm.sys file, you *must* specify this option on the command line when processing NAS file systems.

You can use the *nasnodename* option with the following commands:
- **backup nas**
- **delete filespace**
- **query backup**
- **query filespace**
- **restore nas**

Supported Clients

This option is valid for the AIX and Solaris clients *only*. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **General** category of the Preferences editor.

Syntax

```
►►──NASNodename─ nodename──────────────────────────────────►◄
```

Parameters

nodename
   Specifies the node name for the NAS file server.

Examples

Options file:
```
nasnodename nas2
```

Command line:
```
-nasnodename=nas2
```

Nfstimeout

The **nfstimeout** option specifies the number of seconds the server waits for a status system call on an NFS file system before it times out.

You can use this option to mitigate the default behavior of status calls on file systems. For example, if an NFS file system is stale, a status system call will be timed out by NFS (softmounted) or hang the process (hardmounted).

When the value of this option is changed to a value other than zero, a new thread is created by a caller thread to issue the status system call. The new thread is timed out by the caller thread and the operation can continue.

Note: On Solaris and HP-UX, the **nfstimeout** option can fail if the NFS mount is hard. If a hang occurs, deactivate the **nfstimeout** option and mount the NFS file system soft mounted, as follows:

```
mount -o soft,timeo=5,retry=5 machine:/filesystem /mountpoint
```

The parameters are defined as follows:

soft   Generates a soft mount of the NFS file system. If an error occurs, the stat() function returns with an error if the option hard is used, stat() never returns until the file system is available.

timeo=n
Sets the time out for a soft mount error to n seconds

retry=n
Set the internal retries and the mount retries to 5, the default is 10000.

See "Understanding how NFS hard and soft mounts are handled" on page 98, GC32-0789 for a discussion of how NFS hard and soft mounts are handled.

Supported Clients

This option is for all UNIX clients. The server can also define this option.

Options File

Place this option in the client system options file (dsm.sys) within a server stanza *or* the client options file (dsm.opt).

Syntax

►►──NFSTIMEout *number*──►◄

Parameters

number
Specifies the number of seconds the server waits for a status system call on a file system before timing out. The range of values is 0 through 120; the default is 0 seconds.

Examples

Options file:
```
nfstimeout 10
```

Command line:
```
-nfstimeout=10
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Nodename

Authorized User

Use the ***nodename*** option in your client system options file dsm.sys to identify your workstation to the server. You can use different node names to identify multiple operating systems on your workstation.

When you use the ***nodename*** option, Tivoli Storage Manager prompts for the password assigned to the node you specify, if a password is required.

If you want to restore or retrieve files from the server while you are working from a different workstation, use the ***virtualnodename*** option. See "Virtualnodename" on page 334 for more information.

When connecting to a server, the client must identity itself to the server. This login identification is determined in the following manner:

- In the absence of a ***nodename*** entry in the client system options file (dsm.sys), or a ***virtualnodename*** entry in the client user options file (dsm.opt), or a virtual node name specified on a command line, the default login ID is the name that the **hostname** command returns.
- If a ***nodename*** entry exists in the client system options file (dsm.sys), the ***nodename*** entry overrides the name that the **hostname** command returns.
- If a ***virtualnodename*** entry exists in the client user options file (dsm.opt), or a virtual node name is specified on a command line, it cannot be the same name as the name returned by the **hostname** command. When the server accepts the virtual node name, a password is required (if authentication is on), even if the ***passwordaccess*** option is *generate*. When a connection to the server is established, access is permitted to any file that is backed up using this login ID.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza. You can set this option on the **General** category, **Node Name** field of the Preferences editor.

Syntax

►►──NODename── *nodename*──►◄

Parameters

nodename
    Specifies a 1 to 64 character node name for which you want to request Tivoli Storage Manager services. The default is the name of the workstation. If you set the ***clusternode*** option to *yes*, the default is the cluster name.

Examples

Options file:
        nodename cougar

Command line:
Does not apply.

Noprompt

The ***noprompt*** option suppresses the confirmation prompt that normally appears before you delete an archived file after using the ***deletefiles*** option with the ***archive*** command, or when performing an image restore operation. Using this option can speed up the delete procedure. However, it also increases the danger of accidentally deleting an archived file that you want to save. ***Use this option with caution.***

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──NOPrompt─────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
    dsmc delete archive -noprompt "/home/project/*"

Numberformat

The *numberformat* option specifies the format you want to use to display numbers.

The AIX, Solaris, and HP-UX clients support locales other than English that describe every user interface that varies with location or language. See Table 15 on page 39 for supported locales. The default directories for system-supplied locales are as follows:

- `/usr/lib/nls/loc` for AIX
- `/usr/lib/locale` for Solaris
- `/usr/lib/nls/loc/locales` for HP-UX

The backup-archive and administrative clients obtain format information from the locale definition in effect at the time the client is called. Consult the documentation on your local system for details about setting up your locale definition.

Note: The *numberformat* option does not affect the Web client. The Web client uses the number format for the locale that the browser is running in. If the browser is not running in a supported locale, the Web client uses the number format for US English.

You can use the *numberformat* option with the following commands:
- **delete archive**
- **expire**
- **query archive**
- **query backup**
- **query image**
- **query nas**
- **restore**
- **restore image**
- **restore nas**
- **retrieve**

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt). . You can set this option on the **Regional Settings** category, **Number Format** field of the Preferences editor.

Syntax

►►──NUMberformat─ *number*───►◄

Parameters

number
    Displays numbers using any one of the following formats. Specify the number (1–6) that corresponds to the number format you want to use.
    1   1,000.00

        This is the default for the following supported languages:
        - US English
        - Japanese

- Chinese (Traditional)
- Chinese (Simplified)
- Korean

2 1,000,00

3 1 000,00

This is the default for the following supported languages:
- French
- Czech
- Hungarian
- Polish
- Russian

4 1 000.00

5 1.000,00

This is the default for the following supported languages:
- Brazilian Portuguese
- German
- Italian
- Spanish

6 1'000,00

For AIX, HP-UX, and Solaris: To define number formats, modify the following lines in the source file of your locale. Whatever format you select applies both to output and to input.

decimal_point
> The character that separates the whole number from its fractional part.

thousands_sep
> The character that separates the hundreds from the thousands from the millions.

grouping
> The number of digits in each group that is separated by the thousands_sep character.

Examples

Options file:
```
num 4
```

Command line:
```
-numberformat=4
```

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file unless overridden by the initial command line or by an option forced by the server.

Optfile

The *optfile* option specifies the client user options file you want to use when you start a Tivoli Storage Manager session.

Supported Clients

This option is valid for all UNIX clients.

Syntax

```
►►──OPTFILE =─ file_name──────────────────────────────────────────────────►◄
```

Parameters

file_name
> Specifies an alternate client options file, if you use the fully qualified path name. If you specify only the file name, Tivoli Storage Manager assumes the file name specified is located in the current working directory. The default is dsm.opt.

Examples

Command line:

```
dsmc query session -optfile=myopts.opt
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Password

The *password* option specifies a Tivoli Storage Manager password. If you do not specify this option and your administrator has set authentication to *On*, you are prompted for a password when you start a Tivoli Storage Manager session.

Notes:

1. If the server prompts for a password, the password does not display as you enter it. However, if you use the password option on the command line, your password will display as you enter it.

2. If the Tivoli Storage Manager server name changes or Tivoli Storage Manager clients are directed to a different Tivoli Storage Manager server, all clients must re-authenticate with the server because the stored encrypted password must be regenerated.

The *password* option is ignored when the *passwordaccess* option is set to *generate.*

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

►►──PASsword─ *password*──►◄

Parameters

password
    Specifies a 1 to 63 character password. A password is not case-sensitive. Valid characters include:

    Characters
            Description
    A–Z   Any letter, A through Z, uppercase or lowercase
    0–9   Any number, 0 through 9
    +   Plus
    .   Period
    _   Underscore
    -   Hyphen
    &   Ampersand

Examples

Options file:
        password secretword

Command line:
        -password=secretword

This option is valid only on the initial command line. It is not valid in interactive mode.

Passwordaccess

Authorized User

The *passwordaccess* option specifies whether you want to generate your password automatically or set as a user prompt. Your administrator can require a password for your client node by enabling the authentication feature. Ask your administrator if a password is required for your client node.

If a password is required, you can choose to:
- Set the password for your client node yourself and have Tivoli Storage Manager prompt for it each time you request services.
- Let Tivoli Storage Manager automatically generate a new password for your client node each time it expires, encrypt and store the password in a file, and retrieve the password from that file when you request services. You are not prompted for the password.

Use the *passworddir* option in your client system options file (dsm.sys) to specify the directory location in which to store the encrypted password file. The default directory location depends on how the client was installed. Regardless of where it is stored, the password file created by Tivoli Storage Manager is always named TSM.PWD.

When the *passwordaccess* option is set to *generate* and you specify the *password* option, the *password* option is ignored.

Setting the *passwordaccess* option to *generate* is required in the following situations:
- When using the HSM client.
- When using the Web client.
- When performing NAS operations.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza. You can set this option on the **Authorization** category, **Password Access** section of the Preferences editor.

Syntax

```
               ┌─prompt──┐
►►──PASSWORDAccess─┤         ├─────────────────────────────────►◄
               └─generate─┘
```

Parameters

prompt
    You are prompted for your workstation password each time a client connects to the server. This is the default.

To keep your client node password secure, enter commands without the password and wait for Tivoli Storage Manager to prompt you for the password.

Each user must know the Tivoli Storage Manager password for your client node. Any user who knows the password for your client node can gain access to *all* backups and archives that originate from your client node. For example:

- If the user enters the node name and password for your client node from a different client node, the user becomes a virtual root user.
- If you change the name of your client node (using the **nodename** option in the dsm.sys file, and you specify the same node name in the dsm.opt file, a user who enters the correct password becomes a virtual root user.

API applications must supply the password when a session is initiated. The application is responsible for obtaining the password.

generate
Encrypts and stores your password locally and generates a new password when the old password expires.

A password prompt displays when registering a workstation with a server using open registration or if your administrator changes your password manually.

You can use the **mailprog** option to specify the program and user ID where you want to send the new password each time the old password expires.

When logging in locally, users do not need to know the Tivoli Storage Manager password for the client node. However, by using the **nodename** option at a remote node, users can access files they own and files to which another user grants access. If you change the name of your client node (using the **nodename** option in the dsm.sys file, and you specify the same node name in the dsm.opt file) Tivoli Storage Manager prompts the users for the client node password. If a user enters the correct password, the user becomes a virtual root user.

Examples

Options file:
```
passwordaccess generate
```

Command line:
```
Does not apply
```

Passworddir

Authorized User

The *passworddir* option specifies the directory location in which to store an encrypted password file. The default directory location depends on where the client was installed. Regardless of where it is stored, the password file created by Tivoli Storage Manager is always named TSM.PWD.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Authorization** category, **Location** section of the Preferences editor.

Syntax

```
►►──PASSWORDDIR─ directoryname─────────────────────────────────────────────►◄
```

Parameters

directoryname
Specifies the path in which to store the encrypted password file. The name of the password file is TSM.PWD. If any part of the specified path does not exist, Tivoli Storage Manager attempts to create it.

The default directory for AIX is /etc/security/adsm and for other UNIX platforms it is /etc/adsm.

Examples

Options file:
passworddir /etc/security/tsm

Command line:
Does not apply.

Pick

The *pick* option creates a list of backup versions, images, or archive copies that match the file specification you enter. From the list, you can select the versions to process. Include the *inactive* option to view both active and inactive objects.

For images, if you do not specify a source file space and destination file space, the pick list contains all backed up images. In this case, the images selected from the pick list are restored to their original location. If you specify the source file space and the destination file space, you may select only one entry from the pick list.

Use the *pick* option with the following commands:
- **delete archive**
- **delete group**
- **expire**
- **restore**
- **restore group**
- **restore image**
- **restore nas**
- **restore was**
- **retrieve**

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──PIck──────────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
```
dsmc restore "/home/project/*" -pick -inactive
```

Pitdate

Use the ***pitdate*** option with the ***pittime*** option to establish a point in time for which you want to display or restore the latest version of your backups. Files or images that were backed up *on or before* the date and time you specified, and which were not deleted *before* the date and time you specified, are processed. Backup versions that you create after this date and time are ignored.

Use the ***pitdate*** option with the following commands:
- **query backup**
- **query group**
- **query image**
- **query nas**
- **query was**
- **restore**
- **restore group**
- **restore was**
- **restore image**
- **restore nas**

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──PITDate =─ date───────────────────────────────────────────►◄
```

Parameters

date
> Specifies the appropriate date. Enter the date in the format you selected with the ***dateformat*** option.
>
> When you include ***dateformat*** with a command, it must precede the ***fromdate***, ***pitdate***, and ***todate*** options.

Examples

Command line:
> dsmc restore "/fs1/*" -sub=y -pitdate=08/01/2003 -pittime=06:00:00

Pittime

Use the *pittime* option with the *pitdate* option to establish a point in time for which you want to display or restore the latest version of your backups. Files or images that were backed up *on or before* the date and time you specify, and which were not deleted *before* the date and time you specify, are processed. Backup versions that you create after this date and time are ignored. This option is ignored if you do not specify *pitdate* option.

Use the *pittime* option with the following commands:
- **query backup**
- **query image**
- **query nas**
- **restore**
- **restore image**
- **restore nas**
- **restore was**

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──PITTime =─ time────────────────────────────────────────────►◄
```

Parameters

time

Specifies a time on a specified date. If you do not specify a time, the time defaults to 23:59:59. Specify the time in the format you selected with the *timeformat* option.

When you include the *timeformat* option in a command, it must precede the *fromtime*, *pittime*, and *totime* options.

Examples

Command line:
```
dsmc q b "/fs1/*" -pitt=06:00:00 -pitd=08/01/2003
```

Postschedulecmd/Postnschedulecmd

Authorized User

The *postschedulecmd* option specifies a command that the client program processes after it runs a schedule. The client program waits for the command to complete before it continues with other processing.

If you do not want to wait, specify *postnschedulecmd*.

Notes:

1. If the *postschedulecmd* command does not complete with return code 0, the client will report that the scheduled event completed with return code 8 (unless the scheduled operation encounters a more severe error yielding a higher return code). If you do not want the *postschedulecmd* command to be governed by this rule, you can create a script or batch file that invokes the command and exits with return code 0. Then configure *postschedulecmd* to invoke the script or batch file. The return code for the *postnschedulecmd* command is not tracked, and does not influence the return code of the scheduled event.

2. The server can also define the *postschedulecmd* option (and the *postnschedulecmd* option).

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Scheduler** category, **Schedule Command** button of the Preferences editor.

Syntax

```
►►──┬─POSTSchedulecmd─┬─── "cmdstring" ──────────────────────────────►◄
    └─POSTNschedulecmd─┘
```

Parameters

"cmdstring"
    Specifies the command to process. You can enter a command to be executed after a schedule with this option. Use only one *postschedulecmd* option.

    If the command string contains blanks, enclose the command string in double quotes. If you placed double quotes within the command string, then enclose the entire command string in single quotes.

    Use a blank, or null, string for *cmdstring* if you want to prevent any commands from running that the Tivoli Storage Manager server administrator uses for *postschedulecmd* or *preschedulecmd*. If you specify a blank or null string on *either* option, it prevents the administrator from using a command on *both* options.

    If your administrator uses a blank or null string on the *postschedulecmd* option, you cannot run a post-schedule command.

Examples

Options file:
```
postschedulecmd "restart database"
```

The command string is a valid command for restarting your database.

Command line:
```
-postschedulecmd="restart database"
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Preschedulecmd/Prenschedulecmd

Authorized User

The *preschedulecmd* option specifies a command that the client program processes before it runs a schedule. The client program waits for the command to complete before it starts the schedule.

If you do not want it to wait, specify *prenschedulecmd*.

Notes:

1. Successful completion of the *preschedulecmd* command is considered to be a prerequisite to running the scheduled operation. If the *preschedulecmd* command does not complete with return code 0, the scheduled operation and any *postschedulecmd* and *postnschedulecmd* commands will not run. The client will report that the scheduled event failed, and the return code will be 12. If you do not want the *preschedulecmd* command to be governed by this rule, you can create a script or batch file that invokes the command and exits with return code 0. Then configure *preschedulecmd* to invoke the script or batch file. The return code for the *prenschedulecmd* command is not tracked, and does not influence the return code of the scheduled event.

2. The server can also define the *preschedulecmd* option (and the *prenschedulecmd* option).

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Scheduler** category, **Schedule Command** button of the Preferences editor.

Syntax

```
►►──┬─PRESchedulecmd──┬──  "cmdstring" ──────────────────────────────────►◄
    └─PRENSchedulecmd─┘
```

Parameters

"cmdstring"
    Specifies the command to process. Use only one *preschedulecmd* option. You can enter a command to be executed before a schedule using this option.

    If the command string contains blanks, enclose the command string in double quotes. If you placed double quotes within the command string, then enclose the entire command string in single quotes.

    Use a blank or null string for *cmdstring* if you want to prevent any commands from running that the Tivoli Storage Manager server administrator uses for *postschedulecmd* and *preschedulecmd*. If you specify a blank or null string on *either* option, it prevents the administrator from using a command on *both* options.

    If your administrator uses a blank or null string on the *preschedulecmd* option, you cannot run a pre-schedule command.

Examples

Options file:

```
preschedulecmd "<your database product's quiesce command>
database"
```

The command string is a valid command for quiescing your database.

Command line:

```
-preschedulecmd="quiesce database"
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Preservelastaccessdate

Any application that touches a file may implicitly cause that file's last access date to change to the time that the application touches it. This is a function of the file system, not the application. Because of this, when the client backs up or archives a file, it may trigger an update to the file's last access date. This can cause problems for other applications such as Storage Resource Management (SRM) or Hierarchical Storage Management, whose processing relies on accurate last access dates.

Use the *preservelastaccessdate* option during a backup or archive operation to specify whether to reset the last access date of any specified files to their original value following the backup or archive operation. By default, the Tivoli Storage Manager client *will not* reset the last access date of any backed up or archived files to their original value following the backup or archive operation.

Use this option with the **incremental**, **selective**, or **archive** commands.

Notes:

1. This option only applies to files; it does not apply to directories.
2. Resetting the last access date incurs additional overhead that may impact backup and archive performance. The last access date should be reset only if you are using another application, such as a Storage Resource Management (SRM) or Hierarchical Storage Management that relies on accurate last access dates.
3. You cannot reset the last access date of read-only files. The *preservelastaccessdate* option ignores read-only files and does not change their date.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt). You can set this option on the **Backup** category of the Preferences editor.

Syntax

```
►►──PRESERVELAstaccessdate──┬──No──┬──────────────────────────►◄
                            └──Yes─┘
```

Parameters

No   Specifies that the Tivoli Storage Manager client *will not* reset the last access date of any backed up or archived files to their original value following the backup or archive operation. This is the default.

Yes   Specifies that the Tivoli Storage Manager *will* reset the last access date of any backed up or archived files to their original value following the backup or archive operation.

Examples

Options file:
```
preservelastaccessdate yes
```

Command line:
```
Incremental /proj/test/test_file -preservelastaccessdate=yes
```

Preservepath

The *preservepath* option specifies how much of the source path to reproduce as part of the target directory path when you restore or retrieve files to a new location. Use the -*subdir*=*yes* option to include the entire subtree of the source directory (directories and files below the lowest-level source directory) as source to be restored. If a required target directory does not exist, it is created. If a target file has the same name as a source file, it is overwritten. Use the -*replace*=*prompt* option to have Tivoli Storage Manager prompt you before files are overwritten.

Use the *preservepath* option with the following commands:
- **restore**
- **restore backupset**
- **retrieve**

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──PRESERvepath =──┬─subtree──┬──────────────────────────────►◄
                    ├─complete─┤
                    ├─nobase───┤
                    └─none─────┘
```

Parameters

subtree
> Creates the lowest-level source directory as a subdirectory of the target directory. Files from the source directory are stored in the new subdirectory. This is the default.

complete
> Restores the entire path, starting from the root, into the specified directory. The entire path includes all the directories *except* the file space name.

nobase
> Restores the contents of the source directory without the lowest level, or base directory, into the specified destination directory.

none
> Restores all selected source files to the target directory. No part of the source path at or above the source directory is reproduced at the target.

> If you specify *subdir*=*yes*, Tivoli Storage Manager restores all files in the source directories to the single target directory.

Examples

Command line:
> For the examples below, assume that the server file space contains the following backup copies:

```
/fs/h1/m1/file.a
/fs/h1/m1/file.b
/fs/h1/m1/l1/file.x
/fs/h1/m1/l1/file.y
```

This command:

```
dsmc res /fs/h1/m1/ /u/ann/ -preser=complete
```

Restores these directories and files:

```
/u/ann/h1/m1/file.a
/u/ann/h1/m1/file.b
```

This command:

```
dsmc res /fs/h1/m1/ /u/ann/ -preser=nobase
```

Restores these directories and files:

```
/u/ann/file.a
/u/ann/file.b
```

This command:

```
dsmc res backupset /fs/h1/m1/ /u/ann/ -su=yes
-preser=nobase -loc=file
```

Restores these directories and files:

```
/u/ann/file.a
/u/ann/file.b
/u/ann/file.x
/u/ann/file.y
```

This command:

```
dsmc res /fs/h1/m1/ /u/ann/ -preser=subtree
```

Restores these directories and files:

```
/u/ann/m1/file.a
/u/ann/m1/file.b
```

This command:

```
dsmc res /fs/h1/m1/ /u/ann/ -preser=none
```

Restores these directories and files:

```
/u/ann/file.a
/u/ann/file.b
```

This command:

```
dsmc res /fs/h1/m1/ /u/ann/ -su=yes -preser=complete
```

Restores these directories and files:

```
/u/ann/h1/m1/file.a
/u/ann/h1/m1/file.b
/u/ann/h1/m1/l1/file.x
/u/ann/h1/m1/l1/file.y
```

This command:

```
dsmc res /fs/h1/m1/ /u/ann/ -su=yes -preser=nobase
```

Restores these directories and files:

```
/u/ann/file.a
/u/ann/file.b
/u/ann/l1/file.x
/u/ann/l1/file.y
```

This command:

```
dsmc res /fs/h1/m1/ /u/ann/ -su=yes -preser=subtree
```

Restores these directories and files:

```
/u/ann/m1/file.a
/u/ann/m1/file.b
/u/ann/m1/l1/file.x
/u/ann/m1/l1/file.y
```

This command:

```
dsmc res /fs/h1/m1/ /u/ann/ -su=yes -preser=none
```

Restores these directories and files:

```
/u/ann/file.a
/u/ann/file.b
/u/ann/file.x
/u/ann/file.y
```

Queryschedperiod

Authorized User

The *queryschedperiod* option specifies the number of hours you want the client scheduler to wait between attempts to contact the server for scheduled work. This option applies only when you set the *schedmode* option to *polling*. This option is used only when the **scheduler** is running.

Your administrator can also set this option. If your administrator specifies a value for this option, that value overrides the value set in your client options file after your client node successfully contacts the server.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option. The server can also define this option.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Scheduler** category, **Query Schedule Interval** field of the Preferences editor.

Syntax

►►──QUERYSCHedperiod─ *hours* ──►◄

Parameters

hours
> Specifies the number of hours the client scheduler waits between attempts to contact the server for scheduled work. The range of values is 1 through 9999; the default is 12.

Examples

Options file:
> querysch 6

Command line:
> -queryschedperiod=8

This option is valid only on the initial command line. It is not valid in interactive mode.

Quiet

The *quiet* option limits the number of messages that display on your screen during processing. For example, when you run the **incremental**, **selective**, or **archive** commands, information may appear about each file that is backed up. Use the *quiet* option if you do not want to display this information.

When you use the *quiet* option, error and processing information appears on your screen, and messages are written to log files. If you do not specify *quiet*, the default option, *verbose* is used.

Supported Clients

This option is valid for all UNIX clients. The server can also define the **quiet** option, overriding the client setting. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client user options file (dsm.opt). You can set this option on the **Command Line** category, **Do not display process information on screen** checkbox of the Preferences editor.

Syntax

```
►►──QUIET────────────────────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Options file:
    quiet

Command line:
    -quiet

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file unless overridden by the initial command line or by an option forced by the server.

Removeoperandlimit

The *removeoperandlimit* option specifies that Tivoli Storage Manager removes the 20-operand limit for Unix-family platforms. If you specify the *removeoperandlimit* option with the **incremental**, **selective**, or **archive** commands, the 20-operand limit is not enforced and is restricted only by available resources or other operating system limits.

The *removeoperandlimit* option can be useful if you generate scripts which may invoke the command line client with a large number of operands. For example, you may prescan a directory tree looking for files to back up. As each *eligible* file is discovered, it is added to the operand list of a **selective** command. Later, this **selective** command is submitted by a controlling script. In this case, specifying the *removeoperandlimit* option removes the 20-operand limit for Unix-family platforms.

Notes:

1. The *removeoperandlimit* option *must* be placed immediately after the **incremental**, **selective**, or **archive** command before any file specifications.

2. This option does not accept a value. If this option is specified on a command, the 20-operand limit for Unix-family platforms is removed.

3. Because it adversely affects performance to allow the shell to expand wild cards, it is recommended that you use the *removeoperandlimit* option in backup or archive operations in which wild cards are not used.

4. The *removeoperandlimit* option is valid only on the **incremental**, **selective**, or **archive** commands in batch mode. It is not valid in the client options file (dsm.opt) or client system options file (dsm.sys).

Supported Clients

This option is valid for all UNIX clients.

Syntax

```
►►──REMOVEOPerandlimit──────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
    -removeoperandlimit

Replace

The *replace* option specifies whether to overwrite existing files on your workstation, or to prompt you for your selection when you restore or retrieve files. You can use this option with the following commands:

- **restore**
- **retrieve**
- **restore backupset**
- **restore group**
- **restore was**

Note: Replace prompting does not occur during a scheduled operation. If you set the *replace* option to prompt, Tivoli Storage Manager skips files without prompting during a scheduled operation.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client user options file (dsm.opt). You can set this option on the **Restore** category, **Action for files that already exist** section of the Preferences editor.

Syntax

```
         ┌─Prompt─┐
►►──REPlace─┼────────┼─────────────────────────────────────────────►◄
         ├─All────┤
         ├─Yes────┤
         └─No─────┘
```

Parameters

Prompt
> You are prompted whether to overwrite a file that already exists on your workstation. If the existing file is read-only, you are prompted whether to overwrite it. This is the default.

All
> All existing files are overwritten, including read-only files. If access to a file is denied, you are prompted to skip or overwrite the file. No action is taken on the file until there is a response to the prompt.

Yes
> Any existing files are overwritten, *except* read-only files. If a file is read-only, you are prompted to overwrite the file or skip it. No action is taken on the file until there is a response to the prompt. If access to a file is denied, the file is skipped.

No Existing files are not overwritten. No prompts will display.

Examples

Options file:
```
        replace all
```

Command line:
     `-replace=no`

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file unless overridden by the initial command line or by an option forced by the server.

Resourceutilization

Authorized User

Use the *resourceutilization* option in your client system options file dsm.sys to regulate the level of resources the Tivoli Storage Manager server and client can use during processing.

Regulating backup and archive sessions

When you request a backup or archive, the client can use more than one session to the server. The default is to use a maximum of two sessions; one to query the server and one to send file data. The client can use only one server session if you specify a *resourceutilization* setting of 1. The client is also restricted to a single session if a user who is not an authorized user invokes a UNIX client with *passwordaccess*=*generate* specified.

A client can use more than the default number of sessions when connecting to a server that is Version 3.7 or higher. For example, *resourceutilization*=10 permits up to eight sessions with the server. Multiple sessions may be used for querying the server and sending file data.

Multiple query sessions are used when you specify multiple file specifications with a backup or archive command. For example, if you enter:

```
inc filespaceA filespaceB
```

and you specify *resourceutilization*=5, the client may start a second session to query files on file space B. Whether or not the second session starts depends on how long it takes to query the server about files backed up on file space A. The client may also try to read data from the file system and send it to the server on multiple sessions.

Note: During a backup operation, if you enter multiple file specifications, the result may be that files from one file specification are stored on multiple tapes and interspersed with files from different file specifications. This can decrease restore performance. Setting the *collocatebyfilespec* option to *yes* eliminates interspersing of files from different file specifications, by limiting the client to one server session per file specification. Therefore, if you store the data to tape, files for each file specification are stored together on one tape (unless another tape is required for more capacity). See "Collocatebyfilespec" on page 175 for more information.

Regulating restore sessions

When you request a restore, the default is to use a maximum of one session, based on how many tapes the requested data is stored on, how many tape drives are available, and the maximum number of mount points allowed for the node.

Notes:

1. If all of the files are on disk, only one session is used. There is no multi-session for a pure disk storage pool restore. However, if you are performing a restore in which the files reside on 4 tapes and some on disk, you could use up to 5 sessions during the restore.

2. The Tivoli Storage Manager server can set the maximum number of mount points a node can use on the server using the MAXNUMMP parameter. If the *resourceutilization* option value exceeds the value of the MAXNUMMP on the server for a node, the backup can fail with an *Unknown System Error* message.

For example, if the data you want to restore is on 5 different tape volumes, the maximum number of mount points is 5 for your node, and *resourceutilization* is

set to 3, then 3 sessions will be used for the restore. If you increase the *resourceutilization* setting to 5, then 5 sessions will be used for the restore. There is a 1 to 1 relationship to the number of restore sessions allowed for the *resourceutilization* setting. Multiple restore sessions are only allowed for no query restore operations.

Considerations
The following factors can affect the throughput of multiple sessions:
- The server's ability to handle multiple client sessions. Is there sufficient memory, multiple storage volumes, and CPU cycles to increase backup throughput?
- The client's ability to drive multiple sessions (sufficient CPU, memory, etc.).
- The configuration of the client storage subsystem. File systems that are striped across multiple disks, using either software striping or RAID-5 can better handle an increase in random read requests than a single drive file system. Additionally, a single drive file system may not see performance improvement if it attempts to handle many random concurrent read requests.
- Sufficient bandwidth in the network to support the increased traffic.

Potentially undesirable aspects of running multiple sessions include:
- The client could produce multiple accounting records.
- The server may not start enough concurrent sessions. To avoid this, the server *maxsessions* parameter must be reviewed and possibly changed.
- A query node command may not summarize client activity.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza. You can set this option on the **General** category, **Resource Utilization** field of the Preferences editor.

Syntax

```
►►──RESOURceutilization─ number──────────────────────────────────►◄
```

Parameters

number
> Specifies the level of resources the Tivoli Storage Manager server and client can use during processing. The range of values that you can specify is 1 through 10.

Examples

Options file:
> ```
> resourceutilization 7
> ```

Command line:
> ```
> -resourceutilization=7
> ```

This option is valid only on the initial command line. It is not valid in interactive mode.

Retryperiod

Authorized User

The *retryperiod* option specifies the number of minutes the client scheduler waits between attempts to process a scheduled command that fails, or between unsuccessful attempts to report results to the server. Use this option only when the scheduler is running.

Your administrator can also set this option. If your administrator specifies a value for this option, that value overrides the value in your client system options file after your client node successfully contacts the server.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Scheduler** category, **Retry period** field of the Preferences editor.

Syntax

```
►►──RETRYPeriod─ minutes──────────────────────────────────────────────►◄
```

Parameters

minutes
Specifies the number of minutes the client scheduler waits between attempts to contact the server, or to process a scheduled command that fails. The range of values is 1 through 9999; the default is 20.

Examples

Options file:
```
retryp 10
```

Command line:
```
-retryperiod=10
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Revokeremoteaccess

The *revokeremoteaccess* option restricts an administrator with client access privilege from accessing a client workstation that is running the Web client. This option does not restrict administrators with client owner, system, or policy privilege from accessing your workstation through the Web client.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client user options file (dsm.opt) *or* the client system options file (dsm.sys). You can set this option on the **Web Client** category of the Preferences editor.

Syntax

```
              ┌─None───┐
►►──REVOKEremoteaccess─┤        ├──────────────────────────────────►◄
              └─Access─┘
```

Parameters

None
> Does not revoke access to administrators who have client access authority for the client. This is the default.

Access
> Revokes access to administrators who have client access authority for the client.

Examples

Options file:
> revokeremoteaccess none

Command line:
> Does not apply

Schedcmddisabled

Authorized User

The *schedcmddisabled* option specifies whether to disable the scheduling of commands by the server *action*=**command** option on the **define schedule** server command.

This option does not disable the *preschedulecmd* and *postschedulecmd* commands. However, you can specify *preschedulecmd* or *postschedulecmd* with a blank or a null string to disable the scheduling of these commands.

You can disable the scheduling of commands defined by your Tivoli Storage Manager administrator by setting the *schedcmddisabled* option to *yes*.

Use the **query schedule** command to query the schedules defined by your administrator. See "Query Schedule" on page 401 for more information.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza.

Syntax

```
►►──SCHEDCMDDisabled──┬──────┬──────────────────────────────────►◄
                      ├─No───┤
                      └─Yes──┘
```

Parameters

Yes Specifies that Tivoli Storage Manager disables the scheduling of commands by the server using the *action*=**command** option on the **define schedule** server command.

No Specifies that Tivoli Storage Manager does not disable the scheduling of commands by the server using the *action*=**command** option on the **define schedule** server command. This is the default.

Examples

Options file:
        schedcmddisabled no

Command line:
        Does not apply.

Schedlogname

Authorized User

The *schedlogname* option specifies the path and file name where you want to store schedule log information. Use this option only when the scheduler is running.

When you run the **schedule** command, output from scheduled commands appears on your screen. Output is also sent to the file you specify with this option. If any part of the path you specify does not exist, Tivoli Storage Manager attempts to create it

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Scheduler** category, **Schedule Log** button of the Preferences editor.

Syntax

```
►►──SCHEDLOGName─ filespec──────────────────────────────────────►◄
```

Parameters

filespec
> Specifies the path and file name where you want to store schedule log information when processing scheduled work. If any part of the path you specify does not exist, Tivoli Storage Manager attempts to create it.
>
> If you specify a file name only, the file is stored in your current directory. The default is the installation directory with a file name of dsmsched.log. The dsmsched.log file *cannot* be a symbolic link.

Examples

Options file:
> schedlogname /home/mydir/schedlog.jan

Command line:
> -schedlogname=/home/mydir/schedlog.jan

This option is valid only on the initial command line. It is not valid in interactive mode.

Schedlogretention

Authorized User

The *schedlogretention* option specifies the number of days to keep entries in the schedule log, and whether to save the pruned entries. The schedule log is pruned after a scheduled event completes.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Scheduler** category, **Schedule Log** button of the Preferences editor.

Syntax

```
              ┌─N────┐   ┌─D─┐
►►──SCHEDLOGRetention──┤      ├───┤   ├───────────────────────►◄
              └─days─┘   └─S─┘
```

Parameters

N or *days*
> Specifies how long to wait before pruning the schedule log.
>
> *N* Do not prune the log. This permits the log to grow indefinitely. This is the default.
>
> *days*
> > Specifies the number of days to keep log file entries before pruning. The range of values is zero through 9999.

D or *S*
> Specifies whether to save the pruned entries. Use a space or comma to separate this parameter from the previous one.
>
> *D* Discards the log entries when pruning the log. This is the default.
>
> *S* Saves the log entries when pruning the log.
>
> > Pruned entries are copied to the dsmsched.pru file that is stored in the same directory as the schedule log.

Examples

Options file:
> ```
> schedlogretention 30 S
> ```

Command line:
> ```
> -schedlogretention=30,S
> ```

This option is valid only on the initial command line. It is not valid in interactive mode.

Schedmode

Authorized User

The *schedmode* option specifies whether you want to use the *polling* mode (your client node periodically queries the server for scheduled work), or the *prompted* mode (the server contacts your client node when it is time to start a scheduled operation). All communication methods can use the client polling mode, but only TCP/IP can use the server prompted mode.

This option applies *only if* you are using the TCP/IP communication method, and the **schedule** command is running.

Your administrator can specify that the server support both modes or just one mode. If your administrator specifies that both modes are supported, you can select either schedule mode. If your administrator specifies only one mode, you must specify that mode in your dsm.sys file or scheduled work will not process.

If you specify the *prompted* mode, you must supply values for the *tcpclientaddress* and *tcpclientport* options in your dsm.sys file or on the **schedule** command. You can then be contacted at an address or port other than the one that made first contact with the server.

Notes:

1. When changing the setting of this option in the client system options file (dsm.sys) you must stop and restart the scheduler service for the setting to take effect.
2. Tivoli Storage Manager does not support the scheduler running in prompted mode outside a firewall.
3. The server can also define this option.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Scheduler** category, **Schedule Mode** section of the Preferences editor.

Syntax

```
                  ┌─POlling──┐
►►──SCHEDMODe──┤          ├──────────────────────────────────────►◄
                  └─PRompted─┘
```

Parameters

POlling
> The client scheduler queries the server for scheduled work at prescribed time intervals. This is the default. You can set the time intervals using the *queryschedperiod* option.

PRompted
> The client scheduler waits for the server to contact your client node when scheduled work needs to be done.

Examples

Options file:
      `schedmode prompted`

Command line:
      `-schedmod=po`

This option is valid only on the initial command line. It is not valid in interactive mode.

Scrolllines

The *scrolllines* option specifies the number of lines of information that display on your screen at one time. Use this option when you set the *scrollprompt* option to *Yes* and you use commands.

You can use the *scrolllines* option with the following commands:
- **delete filespace**
- **query archive**
- **query backup**
- **query backupset**
- **query filespace**
- **query image**
- **query group**
- **query nas**
- **query node**
- **query options**

Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client user options file (dsm.opt). You can set this option on the **Command Line** category, **Number of lines to display on screen** field of the Preferences editor.

Syntax

```
►►──SCROLLLines─ number──────────────────────────────────────────◄◄
```

Parameters

number
> Specifies the number of lines of information that display on your screen at one time. The range of values is 1 through 80; the default is 20.

Examples

Options file:
> scrolllines 25

Command line:
> -scrolll=25

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file unless overridden by the initial command line or by an option forced by the server.

Scrollprompt

The *scrollprompt* option specifies whether you want Tivoli Storage Manager to stop and wait after displaying the number of lines of information you specified with the *scrolllines* option, or scroll through and stop at the end of the information list.

You can use the *scrollprompt* option with the following commands:
- **delete filespace**
- **query archive**
- **query backup**
- **query backupset**
- **query filespace**
- **query image**
- **query group**
- **query nas**
- **query node**
- **query options**

Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client user options file (dsm.opt). You can set this option on the **Command Line** category, **Pause after displaying the following number of lines** field of the Preferences editor.

Syntax

```
►►──SCROLLPrompt──┬──No──┬──────────────────────────────────►◄
                  │  No  │
                  └──Yes─┘
```

Parameters

No   Scrolls to the end of the list and stops. This is the default.

Yes   Stops and waits after displaying the number of lines you specified with the *scrolllines* option. The following prompt displays at the bottom of the screen:

```
Press 'Q' to quit, 'C' to continuous scroll, or 'Enter' to
continue.
```

Examples

Options file:
```
scrollprompt yes
```

Command line:
```
-scrollp=yes
```

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file

unless overridden by the initial command line or by an option forced by the server.

Servername

In your client system options file (dsm.sys), the ***servername*** option specifies the name you want to use to identify a server and to begin a stanza containing options for that server. You can name and specify options for more than one server.

The following example demonstrates how to specify options for two different servers:

```
SErvername      server_a
  COMMMethod                TCPip
  TCPPort                   1500
  TCPServeraddress          almvmd.almaden.ibm.com
  PASSWORDAccess            prompt
  GRoups                    tsm
  USERs                     sullivan  mushock  tallan
  INCLExcl                  /adm/tsm/backup.excl

SErvername      server_b
  COMMMethod                SHAREdmem
  shmport                   1520
  PASSWORDAccess            generate
  MAILprog                  /usr/bin/xsend root
  GRoups                    system tsm
  INCLExcl                  /adm/tsm/archive.excl
```

In your client user options file (dsm.opt), the ***servername*** option specifies which server, of those named in your client system options file (dsm.sys), to contact for backup-archive services. When specified in a client user options file (dsm.opt) or on the command line, the ***servername*** option overrides the default server specified in your client system options file.

Notes:

1. You cannot use the ***servername*** option to override the server that is specified for migration in your client system options file.
2. If the Tivoli Storage Manager server name changes or Tivoli Storage Manager clients are directed to a different Tivoli Storage Manager server, all clients will need to have a new password initialized for the new server name.

Supported Clients

This option is for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt) and the client system options file (dsm.sys).

Syntax

►►──SErvername *servername*──►◄

Parameters

servername
> In your client system options file (dsm.sys), specify the name you want to assign to a particular server. In your client user options file (dsm.opt) or on the

command line, specify the name of the server you want to contact for
backup-archive services. A server name is not case sensitive; it can have up to
64 characters.

Examples

Options file:
```
servername server_a
```

Command line:
```
-se=server_b
```

This option is valid only on the initial command line. It is not valid in interactive
mode.

Sessioninitiation

Authorized User

Use the *sessioninitiation* option to control whether the server or client initiates sessions through a firewall. The default is that the client initiates sessions. You can use this option with the **schedule** command.

For the client scheduler, it is unnecessary to open *any* ports on the firewall. If you set the *sessioninitiation* option to *serveronly*, the client will not attempt to contact the server. *All sessions must be initiated by server prompted scheduling* on the port defined on the client with the *tcpclientport* option. The *sessioninitiation* option only affects the behavior of the client scheduler running in the prompted mode. If you set the *sessioninitiation* option to *serveronly*, with the exception of CAD-managed schedulers, the command line client, native GUI, and Web client GUI will still attempt to initiate sessions.

Note: If you set the *sessioninitiation* option to *serveronly*, the client setup wizard and scheduler service may be unable to authenticate to the Tivoli Storage Manager server. In this case, you can execute the scheduler from the command line (dsmc schedule) and enter the password for your node when prompted.

A similar problem can occur if an encryption key is required for backup operations. In this case, you can execute the scheduler from the command line (dsmc schedule) and enter the encryption key when prompted. After the password and encryption key are updated, you must restart the scheduler.

If you set the *sessioninitiation* option to *client*, the client will initiate sessions with the server by communicating on the TCP/IP port defined with the *server* option *tcpport*. This is the default. Server prompted scheduling may be used to prompt the client to connect to the server.

Notes:
1. See "Configuring Tivoli Storage Manager client/server communication across a firewall" on page 45 for more information about Tivoli Storage Manager firewall support.
2. The Tivoli Storage Manager server can specify SESSIONINITiation=*clientorserver* or SESSIONINITiation=*serveronly* on the QUERY NODE, REGISTER NODE, and UPDATE NODE commands. If the server specifies SESSIONINITiation=*clientorserver*, the client can decide which method to use. If the server specifies SESSIONINITiation=*serveronly*, all sessions are initiated by the server.
3. The Tivoli Storage Manager client API does not support this option.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza. You can set this option on the **Scheduler** category, **Session Initiation** field of the Preferences editor.

Syntax

```
►►──SESSIONINITiation──┬──Client──────┬──────────────────────────────────────►◄
                       └──SERVEROnly──┘
```
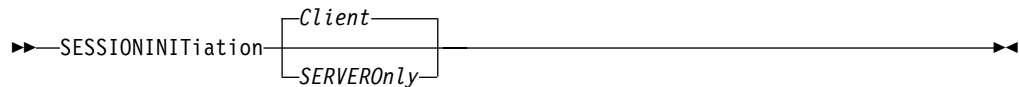
Parameters

Client

Specifies that the client will initiate sessions with the server by communicating on the TCP/IP port defined with the *server* option **tcpport**. This is the default. Server prompted scheduling may be used to prompt the client to connect to the server.

SERVEROnly

Specifies that the server will not accept client requests for sessions. All sessions must be initiated by server prompted scheduling on the port defined on the client with the **tcpclientport** option (see "Tcpclientport" on page 314. Except for CAD-managed schedulers, the command line client, native GUI, and Web client GUI will still attempt to initiate sessions.

Examples

Options file:

```
sessioninitiation serveronly
```

Command line:

```
schedule -sessioninitiation=serveronly
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Shmport

Authorized User

The *shmport* option specifies the TCP/IP port address on which the Tivoli Storage Manager server listens to establish a Shared Memory connection. To use Shared Memory, TCP/IP must be installed on your workstation.

Note: The value specified for the *shmport* option in the client system options file must match the value specified for *shmport* in the server options file.

Supported Clients

This option is valid for AIX, HP-UX, and Solaris clients *only*.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

```
►►──SHMPort port_address──────────────────────────────────────►◄
```

Parameters

port_address
Specifies the TCP/IP address that the server is listening on to establish a Shared Memory connection. The range of values is 1000 through 32767; the default is 1510.

Examples

Options file:
shmport 1520

Command line:
Does not apply.

Showmembers

Use the *showmembers* option with the following commands to display all members of a group:
- **query group**
- **query was**
- **restore group**
- **restore was**

The *showmembers* option is not valid with the *inactive* option. If you want to display members of a group that are not currently active, use the *pitdate* and *pittime* options.

Supported Clients

This option is valid for all UNIX clients.

Syntax

```
►►──SHOWMembers───────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:

```
restore group /virtfs/* -pick -showmembers
```

Snapshotcachesize

Authorized User

Use the ***snapshotcachesize*** option during a snapshot image backup to specify an appropriate snapshot size so that all old data blocks can be stored. A snapshot size of 100 percent will ensure a valid snapshot.

For online image backups, use the ***snapshotcachesize*** option with the **backup image** command, the ***include.image*** option, or in your dsm.sys file.

Supported Clients

This option is valid for Linux86 and Linux IA64 clients *only*. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Image**-**Snapshot** category of the Preferences editor.

Syntax

►►──SNAPSHOTCACHESize─ *snapshotcachesize*──────────────────────────►◄

Parameters

snapshotcachesize
Specifies an appropriate snapshot size so that all old data blocks can be stored during a snapshot image backup. The value is a percent of the total size of the volume being backed up. The range of values is one through 100 percent; the default is 100 percent.

Examples

Options file:
    snapshotcachesize 40

Command line:
    -snapshotcachesize=40

Snapshotroot

Use the *snapshotroot* option with the **incremental**, **selective**, or **archive** commands in conjunction with a third-party application that provides a snapshot of a logical volume, to associate the data on the local snapshot with the real file space data that is stored on the Tivoli Storage Manager server. The *snapshotroot* option does not provide any facilities to take a volume snapshot, only to manage data created by a volume snapshot.

For example, consider an application that takes a snapshot of the /usr file system and mounts it as /snapshot/day1. If you back up this data using the following command:

```
dsmc incremental /snapshot/day1
```

a unique file space called /snapshot/day1 is created on the server. However, you may want to associate the snapshot data with the data already processed for the /usr file system. Using the *snapshotroot* option, you can associate the data with the file space corresponding to the /usr file system on the Tivoli Storage Manager server:

```
dsmc incremental /usr -snapshotroot=/snapshot/day1
```

On a subsequent day, you can back up a snapshot that was written to an alternate location, but managed under the same file space on the server:

```
dsmc incremental /usr -snapshotroot=/snapshot/day2
```

You can perform incremental backups, selective backups, or archives of a single directory, directory structure, or single file using the *snapshotroot* option. In all instances, the *snapshotroot* option must identify the root of the logical volume that was created by the snapshot. For example:

```
dsmc incremental /usr/dir1/* -subdir=yes -snapshotroot=/snapshot/day1
dsmc selective /usr/dir1/sub1/file.txt -snapshotroot=/snapshot/day1
dsmc archive /usr/dir1/sub1/*.txt -snapshotroot=/snapshot/day1
```

If you want to include or exclude specific file specifications, the include and exclude statements should contain the name of the file system that was the *source* of the snapshot (the /usr file system), and *not* the name of the target of the snapshot (/snapshot/day1). This allows you to preserve a set of include and exclude statements regardless of the name of the logical volume to which the snapshot is written. Examples of include and exclude statements are:

```
include /usr/dir1/*.txt 1yrmgmtclass
exclude /usr/mydocs/*.txt
```

The following include-exclude statements are not valid because they contain the name of the snapshot:

```
include /snapshot/day1/dir1/*.txt 1yrmgmtclass
exclude /snapshot/day1/mydocs/*.txt
```

You must use the *snapshotroot* option in conjunction with a single file specification for a incremental, selective, or archive operation. You cannot specify multiple file specifications or no file specifications. For example, these commands are valid:

```
dsmc incremental /usr -snapshotroot=/snapshot/day1
dsmc incremental /usr/dir1/* -snapshotroot=/snapshot/day1
```

The following command is invalid because it contains two file specifications:

```
dsmc incremental /usr/dir1/* /home/dir2/* -snapshotroot=/snapshot/day1
```

The following command is invalid because it contains no file specification:

```
dsmc incremental -snapshotroot=/snapshot/day1
```

Processing SAN File System FlashCopy images

SAN File System provides snapshot support called FlashCopy. FlashCopy images can only be created using the SAN File System administrative interface. FlashCopy images are created on a per fileset (container) basis and are accessible in the .flashcopy directory of each fileset's root directory. For example, there are two filesets, root fileset (the default one) and another fileset called tivoli1. An administrator creates one FlashCopy image for each fileset, called RootImage-1 and tivoli1Image-1 respectively. A SAN File System is mounted in the /tank directory on AIX. In this case, the FlashCopy images are accessible in the following directories:

```
/tank/TIVOLI/.flashcopy/RootImage-1/
/tank/TIVOLI/tivoli1/.flashcopy/tivoli1Image-1/
```

You can specify these directories with the *snapshotroot* option when backing up each fileset as a separate file space as follows:

1. Define a virtual mount point for the fileset, using the *virtualmountpoint* option in your dsm.sys file:

```
virtualmountpoint /tank/TIVOLI
virtualmountpoint /tank/TIVOLI/tivoli1
```

2. Define virtual mount points for the FlashCopy image locations:

```
virtualmountpoint /tank/TIVOLI/.flashcopy/RootImage-1
virtualmountpoint /tank/TIVOLI/tivoli1/.flashcopy/tivoli1Image-1
```

3. Exclude the .flashcopy directory itself, so the data is not backed up twice:

```
exclude.dir /.../.flashcopy
```

4. On the command line, enter the following backup command:

```
dsmc incremental /tank/TIVOLI -snapshotroot=/tank/TIVOLI/.flashcopy/RootImage-1
dsmc incremental /tank/TIVOLI/tivoli1 -snapshotroot=/tank/TIVOLI/tivoli1/
.flashcopy/tivoli1Image-1
```

Notes:

1. Ensure that the snapshotroot references a snapshot of the correct volume. Ensure that snapshotroot refers to the root of the snapshot. If these rules are not followed, unintended results such as files expiring incorrectly may result.

2. You cannot use the *snapshotroot* option in conjunction with the *filelist* option.

3. You can use the *snapshotroot* option in conjunction with the *preschedulecmd* and *postschedulecmd* options, or in a automated script that you execute with the Tivoli Storage Manager client scheduler.

Supported Clients

This option is valid for all UNIX clients.

Syntax

```
►►──SNAPSHOTRoot =─ snapshot_volume_name────────────────────────────►◄
```

Parameters

snapshot_volume_name
Specifies the root of the logical volume created by the third-party snapshot application.

Examples

Command line:

```
dsmc incremental /usr -snapshotroot=/snapshot/day1
```

Subdir

The *subdir* option specifies whether you want to include subdirectories of named directories for processing on the following commands:
- **archive**
- **delete archive**
- **incremental**
- **query archive**
- **query backup**
- **restore**
- **restore backupset**
- **retrieve**
- **selective**

For example, if you set the ***subdir*** option to *yes* when backing up a specific path and file, Tivoli Storage Manager recursively backs up *all* subdirectories under that path, and any instances of the specified file that exist under *any* of those subdirectories.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

```
            ┌─No──┐
►►──SUbdir──┼─────┼──────────────────────────────────────────────────►◄
            └─Yes─┘
```
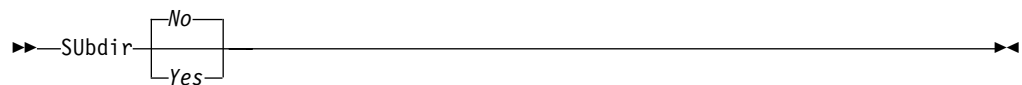
Parameters

No   Subdirectories are not processed. This is the default.

Yes Subdirectories are processed. Because the client program searches all subdirectories of a directory that is being processed, processing can take longer to complete. Specify *Yes* only when necessary.

> **Note:** If you use the *preservepath* option in addition to ***subdir**=yes*, it can affect which subdirectories are processed. For more information, see "Preservepath" on page 276.

If a subdirectory is a mounted file system, it will not process even if you specify ***subdir**=yes*.

Examples

Options file:
```
subdir no
```

Command line:

To restore the structure:

```
/path2/dir1
/path2/dir1/file1
/path2/dir1/dir2
/path2/dir1/dir2/file1
```

enter any of the following commands:

```
dsmc rest "/path/dir1/*" /path2/ -su=yes
dsmc rest "/path/dir1/file*" /path2/ -su=yes
dsmc rest "/path/dir1/file1*" /path2/ -su=yes
```

This option is valid on the initial command line and in interactive mode. If you
use this option in interactive mode, it affects only the command with which it is
specified. When that command completes, the value reverts to the value at the
beginning of the interactive session. This will be the value from the dsm.opt file
unless overridden by the initial command line or by an option forced by the server.

Tapeprompt

The *tapeprompt* option specifies whether you want Tivoli Storage Manager to wait for a tape to mount if it is required for a backup, archive, restore, or retrieve process, or to be prompted for a choice.

In the Tivoli Storage Manager GUI, the Media Mount dialog can display the **Information Not Available** value in the Device and Volume Label fields if you perform a standard (also known as classic) restore or retrieve operation. This value means that this information is only available for no query restore or retrieve operations; not a standard restore or retrieve operation. The Device field displays the name of the device on which to mount the media needed to process an object. The Volume Label field displays the name of the volume needed to process an object. See "No query restore" on page 104 for a discussion of standard and no query restore operations.

Tape prompting does not occur during a scheduled operation regardless of the setting for the *tapeprompt* option.

The *tapeprompt* option can be used with the following commands:
- **archive**
- **incremental**
- **restore**
- **retrieve**
- **selective**

Note: The server can also define this option.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt). You can set this option on the **General** category, **Prompt before mounting tapes** checkbox of the Preferences editor.

Syntax

```
              ┌─No──┐
►►──TAPEPrompt─┼─────┼──────────────────────────────────────────►◄
              └─Yes─┘
```

Parameters

No   You are not prompted for your choice. The server waits for the appropriate tape to mount. This is the default.

Yes   You are prompted when a tape is required to back up, archive, restore, or retrieve data. At the prompt, you can wait for the appropriate tape to be mounted, always wait for a tape to be mounted, skip a particular object, skip all objects on a single tape, skip all objects on all tapes, or cancel the entire operation.

Examples

Options file:
> tapeprompt yes

Command line:
> -tapep=yes

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpadminport

Authorized User

Use the *tcpadminport* option to specify a separate TCP/IP port number on which the server is waiting for requests for administrative client sessions, allowing secure administrative sessions within a private network.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza. You can set this option on the **Communication** category, **Admin Port** field of the Preferences editor.

Syntax

```
►►──TCPADMINPort─┬─────────────────────┬──────────────────────────────►◄
                 └─admin_port_address──┘
```

Parameters

admin_port_address
Specifies the port number of the server. The default value is the value of the *tcpport* option.

Examples

Options file:
  tcpadminport 1502

Command line:
  -tcpadminport=1502

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpbuffsize

Authorized User

The *tcpbuffsize* option specifies the size of the internal TCP/IP communication buffer used to transfer data between the client node and server. Although it uses more memory, a larger buffer can improve communication performance.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Communication** category, **Buffer Size** field of the Preferences editor.

Syntax

```
►►──TCPBuffsize─ size──────────────────────────────────────────────────►◄
```

Parameters

size

Specifies the size, in kilobytes, that you want to use for the internal TCP/IP communication buffer. The range of values is 1 through 512; the default is 31.

Depending on the operating system communication settings, your system might not accept all values in the range of 1 through 512.

Examples

Options file:

```
tcpb 2
```

Command line:

```
-tcpbuffsize=31
```

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpclientaddress

Authorized User

The *tcpclientaddress* option specifies a TCP/IP address if your client node has more than one address, and you want the server to contact an address other than the one that was used to make the first server contact.

Use this option only if you use the *prompted* parameter with the *schedmode* option or when the **schedule** command is running.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza. You can set this option on the **Scheduler** category, **Your TCP/IP address** field of the Preferences editor.

Syntax

```
►►──TCPCLIENTAddress─ client_address───────────────────────────────────►◄
```

Parameters

client_address
Specifies the TCP/IP address you want the server to use to contact your client node. Specify a TCP/IP Internet domain name or a dot address.

Examples

Options file:
    tcpclienta dsmclnt.sanjose.ibm.com

Command line:
    -tcpclientaddress=128.33.10.249
    or
    -tcplcientaddress=khoyt.mycompany.mydomain.com

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpclientport

Authorized User

The *tcpclientport* option specifies a different TCP/IP port number for the server to contact than the one that was used to make the first server contact. If the default port or the specified port is busy, the server attempts to use any available port. Use this option only if you specify the *prompted* parameter with the *schedmode* option or when the **schedule** command is running.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza. You can set this option on the **Scheduler** category, **Your TCP/IP port** field of the Preferences editor.

Syntax

```
►►──TCPCLIENTPort─ client_port_address─────────────────────────────────►◄
```

Parameters

client_port_address
    Specifies the TCP/IP port address you want the server to use to contact your client node. The range of values is 1000 through 32767; the default is 1501.

Examples

Options file:
        tcpclientp 1502

Command line:
        -tcpclientport=1492

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpnodelay

Authorized User

The **tcpnodelay** specifies whether to send small transactions to the server, without buffering them first. A *small transaction* is smaller than the byte limit set with the **txnbytelimit** option. Setting the **tcpnodelay** option to *yes* might improve performance in higher-speed networks.

Note: This option is for AIX clients *only*. All other UNIX clients buffer small transactions before sending them to the server.

Supported Clients

This option is valid for AIX clients.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza. You can set this option on the **Communication** category of the Preferences editor.

Syntax

```
                      ┌─No──┐
►►──TCPNodelay────────┤     ├────────────────────────────────────►◄
                      └─Yes─┘
```
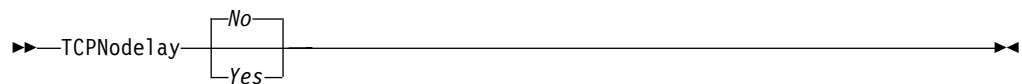
Parameters

No   Do not send small transactions without buffering them first. This is the default.

Yes Send small transactions without buffering them first. When you set the **tcpnodelay** option to *yes*, data packets less than the maximum transmission unit (MTU) size are sent immediately. Setting the **tcpnodelay** option to *yes* might improve performance in higher-speed networks.

Examples

Options file:
```
tcpnodelay yes
```

Command line:
```
Does not apply.
```

Tcpport

Authorized User

The *tcpport* option specifies a TCP/IP port address for a Tivoli Storage Manager server. You can obtain this address from your administrator.

See "Configuring Tivoli Storage Manager client/server communication across a firewall" on page 45 for information about using the *tcpport* option to enable the backup-archive client, command line admin client, and the scheduler to run outside a firewall.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Communication** category, **Server Port** field of the Preferences editor.

Syntax

```
►►──TCPPort─ port_address──────────────────────────────────────────►◄
```

Parameters

port_address
> Specifies the TCP/IP port address that is used to communicate with a server. The range of values is 1000 through 32767; the default is 1500.

Examples

Options file:
>   tcpp 1501

Command line:
>   -tcpport=1501

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpserveraddress

Authorized User

The *tcpserveraddress* option specifies the TCP/IP address for a Tivoli Storage Manager server. You can obtain this server address from your administrator.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Communication** category, **Server Address** field of the Preferences editor.

Syntax

```
►►──TCPServeraddress─ server_address────────────────────────────────►◄
```

Parameters

server_address
> Specifies a 1 to 64 character TCP/IP address for a server. Specify a TCP/IP domain name or a dot address.

Examples

Options file:
> ```
> tcps dsmchost.endicott.ibm.com
> ```

Command line:
> ```
> -tcpserveraddress=129.33.24.99
> ```

This option is valid only on the initial command line. It is not valid in interactive mode.

Tcpwindowsize

Authorized User

Use the *tcpwindowsize* option to specify, in kilobytes, the size you want to use for the TCP/IP sliding window for your client node. The sending host cannot send more data until it receives an acknowledgment and a TCP receive window update. Each TCP packet contains the advertised TCP receive window on the connection. A larger window allows the sender to continue sending data and may improve communication performance, especially on fast networks with high latency.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **Communication** category, **Window Size** field of the Preferences editor.

Syntax

```
►►──TCPWindowsize─ window_size─────────────────────────────────────►◄
```

Parameters

window_size
> Specifies the size, in kilobytes, to use for your client node TCP/IP sliding window. The range of values is 0 through 2048. A value of 0 allows Tivoli Storage Manager to use the operating system default TCP window size. Values from 1 to 2048 indicate that the window size is in the range of 1KB to 2MB. The default is 32.

> **Notes:**
> 1. The TCP window acts as a buffer on the network. It is not related to the *tcpbuffsize* option, or to the send and receive buffers allocated in client or server memory.
> 2. A window size larger than the buffer space on the network adapter might degrade throughput due to resending packets that were lost on the adapter.
> 3. Depending on the operating system communication settings, your system might not accept all values in the range of values.
> 4. For AIX the default is 63.
> 5. For Solaris the maximum value is 1024.

Examples

Options file:
> tcpwindowsize 1

Command line:
> -tcpw=24

This option is valid only on the initial command line. It is not valid in interactive mode.

Timeformat

The *timeformat* option specifies the format in which you want to display system time.

The AIX, Solaris, and HP-UX clients support locales other than English that describe every user interface that varies with location or language. See Table 15 on page 39 for supported locales. The default directories for system-supplied locales are as follows:

- /usr/lib/nls/loc for AIX
- /usr/lib/locale for Solaris
- /usr/lib/nls/loc/locales for HP-UX

The backup-archive and administrative clients obtain format information from the locale definition in effect at the time the client is called. Consult the documentation on your local system for details about setting up your locale definition.

Note: The *timeformat* option does not affect the Web client. The Web client uses the time format for the locale that the browser is running in. If the browser is not running in a locale that Tivoli Storage Manager supports, the Web client uses the time format for US English.

You can use the *timeformat* option with the following commands:
- **delete archive**
- **expire**
- **query archive**
- **query backup**
- **query filespace**
- **query image**
- **query nas**
- **restore**
- **restore image**
- **restore nas**
- **retrieve**

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt). . You can set this option on the **Regional Settings** category, **Time Format** field of the Preferences editor.

Syntax

```
►►──TIMEformat─ format_number───────────────────────────────────►◄
```

Parameters

format_number
Displays time in one of the formats listed below. Select the format number that corresponds to the format you want to use. When you include the *timeformat* option in a command, it must precede the *fromtime*, *pittime*, and *totime* options.

0   Use the locale-defined time format.

For AIX, HP-UX, and Solaris: This is the default if the locale-specified format consists of digits, separator characters, and, if applicable, the AM or PM string.

1   23:00:00 (This is the default)

For AIX, HP-UX, and Solaris: This is the default if the locale-specified format does not consist of digits, separator characters, and, if applicable, the AM or PM string.

2   23,00,00

3   23.00.00

4   12:00:00 A/P

For AIX, HP-UX, and Solaris: To set a particular time format, edit the source file for your locale and modify the t_fmt line to support your needs. Whatever time format you select applies both to output and to input.

″%H:%M:%S″
> Displays time in the form **hh:mm:ss** with **hh** ranging from 0 through 23.

″%H,%M,%S″
> Displays time in the form **hh,mm,ss** with **hh** ranging from 0 through 23.

″%I,%M,0p″
> Displays time in the form **hh,mm,ssA/P** with **hh** ranging from 1 through 12 and **A/P** is the local abbreviation for ante-meridian (AM in English) or post-meridian (PM in English).

Examples

Options file:
> timeformat 4

Command line:
> -time=3

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file unless overridden by the initial command line or by an option forced by the server.

Toc

Use the *toc* option with the **backup nas** command or the *include.fs.nas* option to specify whether Tivoli Storage Manager saves Table of Contents (TOC) information for each file system backup. You should consider the following when deciding whether you want to save TOC information:

- If you save TOC information, you can use the **query toc** server command to determine the contents of a file system backup in conjunction with the **restore node** server command to restore individual files or directory trees.
- You can also use the Tivoli Storage Manager Web client to examine the entire file system tree and select files and directories to restore.
- Creation of a TOC requires that you define the TOCDESTINATION attribute in the backup copy group for the management class to which this backup image is bound. Note that TOC creation requires additional processing, network resources, storage pool space, and possibly a mount point during the backup operation.
- If you do not save TOC information, you can still restore individual files or directory trees using the **restore node** server command, provided that you know the fully qualified name of each file or directory and the image in which that object was backed up.

Supported Clients

This option is valid for AIX and Solaris clients *only*. The Tivoli Storage Manager client API does not support this option.

Options File

Place the *include.fs.nas* statement containing the *toc* value in the client system options file (dsm.sys).
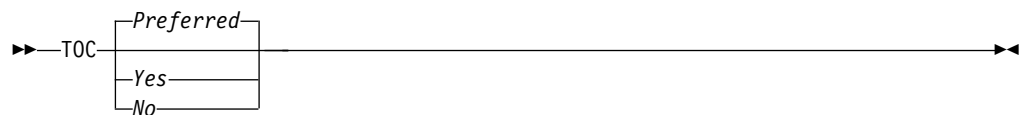
Syntax

```
                       ┌─Preferred─┐
►►──TOC─────────────────────────────────────────────────────►◄
                       ├─Yes───────┤
                       └─No────────┘
```

Parameters

Yes Specifies that Tivoli Storage Manager saves TOC information during a NAS file system image backup. However, the backup will fail if an error occurs during creation of the TOC.

No Specifies that Tivoli Storage Manager does not save TOC information during a NAS file system image backup.

Preferred
  Specifies that Tivoli Storage Manager saves TOC information during a NAS file system image backup. The backup does not fail if an error occurs during creation of the TOC. This is the default.

Note: If the *mode* option is set to *differential* and you set the *toc* option to *preferred* or *yes*, but the last full image does not have a TOC, Tivoli Storage Manager performs a full image backup and creates a TOC.

Examples

Options file:
```
include.fs.nas netappsj/vol/vol0 homemgmtclass toc=yes
```

Command line:
```
backup nas -nasnodename=netappsj /vol/vol0 -toc=yes
```

Todate

Use the *todate* option with the *totime* option to specify an ending date and time to which you want to search for backups or archives during a restore, retrieve, or query operation. For example, you might request a list of files that were backed up before 11:59 PM on June 30, 2002.

Use the *todate* and *totime* options with the *fromtime* and *fromdate* options to request a list of backed up or archived files within a period of time. For example, you might request a list of files that were backed up between 6:00 AM on July 1, 2002 and 11:59 PM on July 30, 2002.

Use the *todate* option with the following commands:
- **query archive**
- **query backup**
- **restore**
- **restore group**
- **retrieve**
- **restore was**

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

►►──TODate =─ *date*──►◄

Parameters

date
>   Specifies an ending date. Enter the date in the format you selected with the *dateformat* option.
>
>   When you include *dateformat* with a command, it must precede the *fromdate*, *pitdate*, and *todate* options.

Examples

Command line:
>   dsmc restore "/home/user1/*" -todate=12/11/2003

Totime

Use the *totime* option with the *todate* option to specify an ending date and time to which you want to search for backups or archives during a restore, retrieve, or query operation. For example, you might request a list of files that were backed up before 11:59 PM on June 30, 2003. Tivoli Storage Manager ignores this option if you do not specify the *todate* option.

Use the *totime* and *todate* options with the *fromtime* and *fromdate* options to request a list of files that were backed up within a period of time. For example, you might request a list of files that were backed up between 6:00 AM on July 1, 2003 and 11:59 PM on July 30, 2003.

Use the *totime* option with the following commands:
- **query archive**
- **query backup**
- **restore**
- **restore group**
- **restore was**
- **retrieve**

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──TOTime =─ time───────────────────────────────────────────────►◄
```

Parameters

time

Specifies an ending time. If you do not specify a time, the time defaults to 00:00:00. Specify the time in the format you selected with the *timeformat* option.

When you include the *timeformat* option in a command, it must precede the *fromtime*, *pittime*, and *totime* options.

Examples

Command line:
```
dsmc restore "/home/user1/*" -todate=09/17/2003 -totime=23:00:00
```

Txnbytelimit

Authorized User

The *txnbytelimit* option specifies the number of kilobytes the client program buffers before it sends a transaction to the server. A *transaction* is the unit of work exchanged between the client and server. Because the client program can transfer more than one file or directory between the client and server before it commits the data to server storage, a transaction can contain more than one file or directory. This is called a *transaction group*.

This option permits you to control the amount of data sent between the client and server before the server commits the data and changes to the server database, thus changing the speed with which the client performs work. The amount of data sent applies when files are batched together during backup or when receiving files from the server during a restore procedure.

The server administrator can limit the number of files or directories contained within a transaction group using the *txngroupmax* option; the actual size of a transaction can be less than your limit. Once this number is reached, the client sends the files to the server *even if* the transaction byte limit is not reached.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys). You can set this option on the **General** category **Transaction Buffer Size** field of the Preferences editor.

Syntax

```
►►──TXNBytelimit─ number──────────────────────────────────────────►◄
```

Parameters

number
    Specifies the number of kilobytes the client program can buffer together in a transaction before it sends data to the server. The range of values is 300 through 2097152 (2 GB); the default is 2048.

Examples

Options file:
    `txnb 2048`

Command line:
    `-txnb=2048`

This option is valid only on the initial command line. It is not valid in interactive mode.

Type

Use the *type* option with the **query node** command to specify the type of node to query.

Supported Clients

This option is valid for AIX and Solaris clients *only*. The Tivoli Storage Manager client API does not support this option.

Syntax

```
              ┌─any────┐
►►──TYpe =────┼────────┼──────────────────────────────────────────►◄
              ├─nas────┤
              ├─server─┤
              └─client─┘
```

Parameters

any
  Specifies all nodes registered at the server. This is the default.

nas
  Specifies all NAS nodes registered at the server.

server
  Specifies client nodes that are other Tivoli Storage Manager servers.

client
  Specifies client nodes that are backup-archive clients.

Examples

Command line:
  query node -type=nas

Users

Authorized User

The *users* option authorizes specific users on your workstation to request services from a server. You can use this option more than once to specify a large number of user IDs. If you do not specify group names with the *groups* option, or user IDs with the *users* option, all users can request Tivoli Storage Manager services. If you use the *groups* option, the *users* option, or both, only users included in one of the specified groups, or included in the list of users, can request Tivoli Storage Manager services.

Define your root user name only with the *users* option to exclude all other users from accessing the server.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza.

Syntax

```
>>--+--USERs--+-- username --+------------------------------------><
```

Parameters

username
Names a user that you want to authorize to request Tivoli Storage Manager services.

Examples

Options file:
```
users  carol  larry  davecd  kathyba  michelle
users  amyb  tkaspar  kbsmith  egray  srjames
```

Command line:
Does not apply.

V2archive

Use the *v2archive* option with the **archive** command to archive only files to the server. Tivoli Storage Manager will not process directories that exist in the path of the source file specification.

This option differs from the *filesonly* option in that the *filesonly* option archives the directories that exist in the path of the source file specification.

The *v2archive* and *dirsonly* options are mutually exclusive and an error message displays if you use both options in the same **archive** command.

This option is not persistent; you must explicitly specify this option in each **archive** command.

If you use this option, you may want to consider the following:
- You may experience performance problems when retrieving large amounts of data archived with this option.
- You may want to use this option only if you are concerned about expiration performance on a server that already contains extremely large amounts of archived data.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──V2archive──────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

This command:

```
dsmc archive "/home/relx/dir1/*" -v2archive -su=y.
```

Archives these files:

```
/home/relx/dir1/file1
/home/relx/dir1/file2
/home/relx/dir1/file3
/home/relx/dir1/dir2/file4
/home/relx/dir1/dir2/file5
```

Note: Tivoli Storage Manager does not archive /home/relx/dir1 and /home/relx/dir1/dir2.

Verbose

The *verbose* option specifies that you want processing information to display on your screen. This is the default. When you run the **incremental**, **selective**, or **archive** commands, information displays about each file that is backed up. Use the *quiet* option if you do not want to display this information.

The following behavior applies when using the *verbose* and *quiet* options
- If the server specifies either the *quiet* or *verbose* option in the server client option set, the server settings override the client values, even if **force** is set to *no* on the server.
- If you specify *quiet* in your dsm.opt file, and you specify *-verbose* on the command line, *-verbose* prevails.
- If you specify both *-quiet* and *-verbose* on the same command, the last option encountered during options processing prevails. If you specify *-quiet -verbose*, *-verbose* prevails. If you specify *-verbose -quiet*, *-quiet* prevails.

Supported Clients

This option is valid for all UNIX clients. The server can also define this option. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client user options file (dsm.opt). You can set this option on the **Command Line** category, **Do not display process information on screen** checkbox of the Preferences editor.

Syntax

```
►►──VErbose──────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Options file:
```
verbose
```

Command line:
```
-verbose
```

This option is valid on the initial command line and in interactive mode. If you use this option in interactive mode, it affects only the command with which it is specified. When that command completes, the value reverts to the value at the beginning of the interactive session. This will be the value from the dsm.opt file unless overridden by the initial command line or by an option forced by the server.

Verifyimage

Use the *verifyimage* option with the **restore image** command to specify that you want to enable detection of bad sectors on the destination target volume. If bad sectors are detected on the target volume, Tivoli Storage Manager issues a warning message on the console and in the error log.

Supported Clients

This option is valid for AIX, HP-UX, Linux86, Linux IA64, Linux pSeries, Linux iSeries, and Solaris *only*. The Tivoli Storage Manager client API does not support this option.

Syntax

```
►►──VERIFYImage────────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this option.

Examples

Command line:
        dsmc restore image /usr -verifyimage

Virtualfsname

Use the *virtualfsname* option with the **backup group** command to specify the name of the virtual file space for the group on which you want to perform the operation.

Supported Clients

This option is valid for all UNIX clients.

Syntax

►►──VIRTUALFSname =─ *fsname*───────────────────────────────────────►◄

Parameters

fsname
　　Specifies the name of the container for the group on which you want to perform the operation.

Examples

Command line:

```
backup group -filelist=/home/dir1/filelist1 -groupname=group1
-virtualfsname=/virtfs -mode=full
```

Virtualmountpoint

Authorized User

The **_virtualmountpoint_** option defines a virtual mount point for a file system if you want to consider files for backup that begin with a specific directory within that file system. Using the **_virtualmountpoint_** option to identify a directory within a file system provides a direct path to the files you want to back up, saving processing time. It is more efficient to define a virtual mount point within a file system than it is to define that file system using the **_domain_** option, and then to use the **_exclude_** option in your include-exclude options list to exclude the files that you do not want to back up.

Use the **_virtualmountpoint_** option to define virtual mount points for multiple file systems, for local and remote file systems, and to define more than one virtual mount point within the same file system. Virtual mount points cannot be used in a file system handled by automounter.

Note: If the directory that you want to specify as a virtual mount point is a symbolic link, set the **_followsymbolic_** option to *Yes*. If that option is set to *no* (the default), you are not permitted to use a symbolic link as a virtual mount point.

After you define a virtual mount point, you can specify the path and directory name with the **_domain_** option in either the default client options file or on the **incremental** command to include it for incremental backup services. You can also specify the path and directory name of the virtual mount point with the **_domain_** option in your client options files and on the **incremental** command. When you perform a backup or archive using the **_virtualmountpoint_** option, the **query filespace** command will list the virtual mount point in its response along with other file systems. Generally, directories that you define as virtual mount points are treated as actual file systems and requires that the **_virtualmountpoint_** option is specified in the dsm.sys file to restore or retrieve the data.

Supported Clients

This option is valid for all UNIX clients. The Tivoli Storage Manager client API does not support this option.

Options File

Place this option in the client system options file (dsm.sys).

Syntax

```
►►──┬─VIRTUALMountpoint directory─┬──────────────────────►◄
     └──────────────◄─────────────┘
```

Parameters

directory
> Specifies the path and directory name for the directory you want to use as the virtual mount point for a file system. You cannot use wildcard characters in either the path or directory names.

Define only one virtual mount point with each *virtualmountpoint* option that you include in your client system options file. Use the *virtualmountpoint* option as many times as necessary to define all of the virtual mount points that you want to use.

Examples

Options file:

```
virtualmountpoint /afs/xyzcorp.com/home/ellen
virtualmountpoint /afs/xyzcorp.com/home/ellen/test/data
```

Command line:
Does not apply.

Virtualnodename

The *virtualnodename* option specifies the node name of your workstation when you want to restore or retrieve files to a different workstation.

When you use the *virtualnodename* option in your client user options file, or with a command:

- You must specify the name you specified with the *nodename* option in your client system options file (dsm.sys). This name should be different from the name returned by the **hostname** command on your workstation.
- Tivoli Storage Manager prompts for the password assigned to the node you specify, if a password is required. If you enter the correct password, you have access to all backups and archives that originated from the specified node.

When connecting to a server, the client must identity itself to the server. This login identification is determined in the following ways:

- If the *nodename* and *virtualnodename* options are not specified, or a virtual node name is not specified on the command line, the default login ID is the name returned by the **hostname** command.
- If the *nodename* option is specified, the name specified with the *nodename* option overrides the name returned by the **hostname** command.
- If the *virtualnodename* option is specified, or a virtual node name is specified on a command line, it cannot be the same name as the name returned by the **hostname** command.

When the virtual node name is accepted by the server, a password is required (assuming authentication is on), even if the *passwordaccess* option is *generate*. Once a connection to the server is established, then access is permitted to any file backed up using this login ID.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

```
►►──VIRTUALNodename─ nodename──────────────────────────────────────────────►◄
```

Parameters

nodename
    Specifies a 1- to 64-character name that identifies the node for which you want to request Tivoli Storage Manager services. There is no default.

Examples

Options file:
        virtualnodename cougar

Command line:
        -virtualn=banshee

This option is valid only on the initial command line. It is not valid in interactive mode.

Wasexphome

To back up the WebSphere Application Server-Express, use the *wasexphome* option to specify the fully qualified installation path of the WebSphere Application Server-Express. Ensure that the *washome* option is *not* set.

Supported Clients

This option is valid for AIX, Solaris, and Linux86.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

►►──WASExpHome── ──*pathvalue*──►◄

Parameters

pathvalue
   Specifies the fully qualified path of the home directory of the WebSphere Application Server - Express. If the path contains spaces, enclose the path in double quotes.

Examples

Options file:
```
wasexphome /usr/mywas/Express
```

Washome

Use the *washome* option in your client user options file (dsm.opt) to specify an override base install path for the Application Server. You can use this option if your entire WebSphere installation is corrupted and must be reinstalled, or you are installing WAS on a new machine. See "WAS instance restore procedures" on page 420 for more information.

If you do not specify a value for this option, Tivoli Storage Manager uses the default installation path. If there are multiple installations of the Application Server on the same machine, use a different options file for each installation with the proper path to the installation directory.

Supported Clients

This option is valid for AIX, Solaris, and Linux86 clients.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

```
►►──WASHOMe── ──pathvalue──────────────────────────────────────►◄
```

Parameters

pathvalue
Specifies the fully qualified path of the home directory of the WebSphere Application Server installation. This value is the path of the directory where the configuration information and properties reside. If the path contains spaces, enclose the path in double quotes.

Examples

Options file:
```
washome /usr/mywas/appserver
```

Wasndhome

Use the *wasndhome* option in your client user options file (dsm.opt) to specify an override base install path for the Network Deployment Manager. You can use this option if your entire WebSphere installation is corrupted and must be reinstalled, or you are installing WAS on a new machine. See "WAS instance restore procedures" on page 420 for more information.

If you do not specify a value for this option, Tivoli Storage Manager uses the default installation path. If there are multiple installations of the Network Deployment Manager on the same machine, use a different options file for each installation with the proper path to the installation directory.

Supported Clients

This option is valid for AIX, Solaris, and Linux86 clients.

Options File

Place this option in the client user options file (dsm.opt).

Syntax

```
►►──WASNDHome── ──pathvalue──────────────────────────────────────────►◄
```

Parameters

pathvalue
Specifies the fully qualified path of the home directory of the Network Deployment Manager installation. This value is the path of the directory where the configuration information and properties reside. If the path contains spaces, enclose the path in double quotes.

Examples

Options file:
```
wasndhome /usr/mywas/DeploymentManager
```

Wasnode

Use the *wasnode* option with the **set waspassword** command to specify the WAS node name when performing the operation on the WAS Network Deployment Manager or Application Server.

Supported Clients

This option is valid for AIX, Solaris, and Linux86 clients.

Syntax

```
►►──WASNode =── nodename──────────────────────────────────►◄
```

Parameters

nodename
Specifies the WAS node name when performing the operation on the WAS Network Deployment Manager or Application Server.

Examples

Command line:

```
backup was -wasnode=ednode -wastype=app
```

Wastype

Use the *wastype* option with the **backup was**, **query was**, or **restore was**, or **set waspassword** commands to perform the operation on the WebSphere Application Server (WAS) Network Deployment Manager (contains setup, application files, and configuration information), the Application Server, or both.

Supported Clients

This option is valid for AIX, Solaris, and Linux86 clients.

Syntax

```
►►──WASType =─┬─ND────┬──────────────────────────────────────────────►◄
              │       │
              ├─APP───┤
              ├─ANY───┤
              └─LOCAL─┘
```

Parameters

ND
> Specifies that you want to perform the operation on the Network Deployment Manager (ND) associated with the node name that you specify. This is the default for the **backup was** and **restore was** commands.

APP
> Specifies that you want to perform the operation on the Application Server (APP) associated with the node name that you specify.

ANY
> Specifies that you want to query all backups of Network Deployment Manager and Application Server associated with the node name that you specify, including instances of ND and APP. This parameter is valid for the **query was** command only, and is the default.

LOCAL
> Specifies that you want to query all the of the Application Servers, Network Deployment Manager, and their instances on your local machine. This parameter displays the instance name, hostname, soap port information, installed path, the type of the WAS (ND or APP), and whether security is enabled. This parameter is valid for the **query was** command only.

Examples

Command line:
```
dsmc query was -wastype=local
```

Wasuser

If WAS security is enabled, use the *wasuser* option with the **set waspassword** command to set the WAS user name for each installation of WAS on your machine.

Supported Clients

This option is valid for AIX, Solaris, and Linux86 clients.

Syntax

```
►►──WASuser =── username──────────────────────────────────────►◄
```

Parameters

username
Specifies the WAS user name when performing the operation on the WAS Network Deployment Manager or Application Server.

Examples

Command line:

```
dsmc set waspassword -wasnode=wasnode -wastype=app -wasuser=ed
```

Webports

The *webports* option enables the use of the Web client outside a firewall by specifying the TCP/IP port number used by the Tivoli Storage Manager Client Acceptor daemon and Web Client Agent service for communications with the Web GUI.

Values for both the Client Acceptor daemon and the Web Client Agent service are required.

If you do not specify this option, the default value, zero (0), is used for both ports. This causes TCP/IP to randomly assign a free port number for the Client Acceptor daemon and the Web Client Agent service.

For further considerations regarding Tivoli Storage Manager firewall support, see "Configuring Tivoli Storage Manager client/server communication across a firewall" on page 45.

Note: The Tivoli Storage Manager client API does not support this option.

Supported Clients

This option is valid for all UNIX clients.

Options File

Place this option in the client system options file (dsm.sys) *within* a server stanza. You can set this option on the **Web Client** category, **WEB Ports** fields of the Preferences editor.

Syntax

```
►►──WEBPorts─ cadport─ agentport──────────────────────────────────►◄
```

Parameters

cadport
> Specifies the *required* Tivoli Storage Manager Client Acceptor daemon port number. The range of values is 1000 through 32767. If a value is not specified, the default, zero (0), causes TCP/IP to randomly assign a free port number.

agentport
> Specifies the *required* Tivoli Storage Manager Web client agent service port number. The range of values is 1000 through 32767. If a value is not specified, the default, zero (0), causes TCP/IP to randomly assign a free port number.

Examples

Options file:
```
webports 2123 2124
```

Command line:
```
Does not apply.
```

Chapter 10. Using commands

Tivoli Storage Manager provides a command line interface (CLI) that you can use as an alternative to the graphical user interface (GUI). This chapter describes how to start or end a client command session and how to enter commands. Table 61 shows a list of tasks related to entering commands.

Table 61. Entering commands

Task	Page
Starting and ending a client command session	345
Entering client commands	347
Remembering previous commands	349
Using wildcard characters	350

Table 62 provides an alphabetical list of the commands, a brief description, and where to locate more information.

Table 62. Commands

Command	Description	Page
archive	Archives files from a workstation to Tivoli Storage Manager storage.	352
backup group	Creates and backs up a group containing a list of files from one or more file space origins to a virtual file space on the Tivoli Storage Manager server.	354
backup image	Creates an image backup of one or more file systems or logical volumes that you specify.	356
backup nas	Creates an image backup of one or more file systems belonging to a Network Attached Storage (NAS) file server.	360
backup was	Backs up the WebSphere Application Server (WAS) Network Deployment Manager (contains setup, application files, and configuration information) or the Application Server to the Tivoli Storage Manager server.	362
cancel process	Displays a list of current NAS (if NDMP support is enabled) image backup and restore processes for which the administrative user has authority.	364
cancel restore	Displays a list of restartable restore sessions from which you can select one to cancel.	365
delete access	Deletes authorization rules for files or images that are stored on the server.	366
delete archive	Deletes archived files from Tivoli Storage Manager server storage.	367
delete filespace	Deletes file spaces in Tivoli Storage Manager server storage.	368
delete group	Deletes a group backup on the Tivoli Storage Manager server.	370

Table 62. Commands (continued)

Command	Description	Page
expire	Inactivates backup objects that you specify in the file specification or with the *filelist* option.	372
help	Displays a Table of Contents of help topics for the command line client..	374
incremental	Backs up all new or changed files or directories in the default client domain or from file systems, directories, or files you specify, unless you exclude them from backup services.	375
loop	Starts an interactive command session.	379
macro	Executes commands within a macro file that you specify.	381
monitor process	Displays a list of current NAS image backup and restore processes from which you can select one to cancel.	382
query access	Displays a list of current authorization rules.	383
query archive	Displays a list of archived files.	384
query backup	Displays a list of backup versions.	386
query backupset	Queries a backup set from a local file, tape device, or the Tivoli Storage Manager server.	388
query filespace	Displays a list of file spaces in Tivoli Storage Manager storage. You can also specify a single file space name to query.	390
query group	Displays information about group backups and their members.	392
query image	Displays information about image backups.	394
query inclexcl	Displays a list of include-exclude statements in the order in which they are processed during backup and archive operations.	396
query mgmtclass	Displays information about available management classes.	397
query node	Displays all the nodes for which an administrative user ID has authority to perform operations.	398
query options	Displays all or part of your options and their current settings.	399
query restore	Displays a list of your restartable restore sessions in the server database.	400
query schedule	Displays information about scheduled events for your node.	401
query session	Displays information about your session, including the current node name, when the session was established, server information, and server connection information.	402
query systeminfo	Gathers Tivoli Storage Manager system information and outputs this information to a file or the console.	403

Table 62. Commands (continued)

Command	Description	Page
query was	Displays backups of the WebSphere Application Server (WAS) Network Deployment Manager (contains setup, application files, and configuration information) or the Application Server that match the node name and type of the WAS group backup that you specify.	405
restart restore	Displays a list of restartable restore sessions from which you can one to restart.	406
restore	Restores copies of backup versions of your files from a Tivoli Storage Manager server.	407
restore backupset	Restores a backup set from the Tivoli Storage Manager server or a local file. You can also restore a backup from a tape device.	410
restore group	Restores specific members or all members of a group backup.	413
restore image	Restores a file system or raw volume image backup.	415
restore nas	Restores the image of a file system belonging to a Network Attached Storage (NAS) file server.	418
restore was	Restores the WebSphere Application Server (WAS) Network Deployment Manager (contains setup, application files, and configuration information) or the Application Server from the Tivoli Storage Manager server.	420
retrieve	Retrieves copies of archived files from the Tivoli Storage Manager server.	423
schedule	Starts the client scheduler on the workstation.	425
selective	Backs up selected files.	427
set access	Authorizes another user to access your backup versions, archived copies, or image backups..	430
set password	Changes the Tivoli Storage Manager password for your workstation.	432
set waspassword	When WAS security is enabled, this command allows you to set your WebSphere node name, user name, and password for the WAS Network Deployment Manager or the Application Server.	433

Starting and ending a client command session

You can start or end a client command session in either batch mode or interactive mode. Use batch mode when you want to enter a *single* client command. Tivoli Storage Manager processes the command and returns to the shell command prompt.

Use interactive mode when you want to enter a *series* of commands. Since Tivoli Storage Manager establishes connection to the server only once for interactive mode, a series of commands can process more quickly. Tivoli Storage Manager processes the commands and returns to the **tsm**> prompt.

Process commands in batch mode

When you enter a *single* command in batch mode, precede it with the executable program name, **dsmc**. Tivoli Storage Manager processes the command and returns to the shell command prompt. For example, to process the **incremental** command in batch mode, you would enter:

```
dsmc incremental
```

Tivoli Storage Manager prompts you each time you enter a command if the **passwordaccess** option is set to *prompt* and authentication on the server is set to *On*. Type your password and press Enter.

You can also enter your password using the **password** option with a command, but your password appears on the screen. For example, if your password is **secret**, enter:

```
dsmc incremental –password=secret
```

If you set the **passwordaccess** option to *generate* in your dsm.opt file, you do not need to specify the password with the command. Tivoli Storage Manager *only* prompts you for your password if you are registering your workstation with a server or manually changing your password.

Process commands in interactive mode

Use the *interactive* mode (or *loop* mode) to enter a series of commands. Enter **dsmc** on the command line and press Enter. When the **tsm>** command prompt appears, type the command name and press Enter. *Do not* precede each command with the executable program name, **dsmc**. Alternatively, you can enter **dsmc loop** on the command line to start a client command session in interactive mode. **Loop** is the default command for **dsmc**.

If a password is required, Tivoli Storage Manager prompts you before you enter the first command. Type your user ID and password and press Enter. You can also enter your password using the **password** option with the **loop** command, but your password appears on the screen. For example, if your password is **secret**, enter:

```
dsmc loop –password=secret
```

To end an interactive session, enter **quit** at the prompt.

Notes:

1. In loop mode, following a restore operation directly from tape, the mount point is not released in case additional restore requests are made to that volume. If you request a backup operation in the same session and that mount point is the only one available, the backup operation will stop with the following message:

   ```
   Waiting for mount of offline media
   ```

   In this case, the mount point is not released until one of the following conditions is met:
   - The device class MOUNTRETENTION limit is satisfied.
   - The client idletimeout period is satisfied.
   - The dsmc loop session is closed after the restore operation completes, allowing you to start a subsequent loop mode session to perform the backup operation.

2. In interactive mode, you cannot enter a file specification that contains national language characters. If a command contains national characters, process the command in batch mode by preceding the command with the executable program name, **dsmc**.

Entering client commands

A client command can include one or more of these components:
- Command name
- Options
- Parameters

The sections that follow describe each of these components.

Command name

The first part of a command is the command name. The command name consists of a single word, such as **help** or **schedule**, or an action word and an object for that action, such as **query archive**. Enter the full command name, or its minimum abbreviation. For example, you can enter any of the following versions of the **query schedule** command:

```
query schedule
q sc
q sched
query sc
```

Options

There are two groups of options that you can use with commands:

- **Client options**: The group of options that are set in your client user options file (dsm.opt). To override an option in the client user options file (dsm.opt), enter the option with a command. For detailed information about client options, see "Client options reference" on page 168.

- **Client command options**: Use this group of options with specific commands on the command line *only*. For detailed information about client command options, see "Client options reference" on page 168.

Options handling in interactive mode

In interactive mode, options you enter on the initial command line will override the value that you specified in your client user options file (dsm.opt) or client system options file (dsm.sys). This value remains in effect for the entire interactive session unless overridden by a different value on a given interactive command. For example, if you set the *subdir* option to *yes* in your client user options file (dsm.opt), and you specify -*subdir*=*no* on the initial command line, the -*subdir*=*no* setting remains in effect for the entire interactive session unless overridden by the -*subdir*=*yes* value on a given interactive command. However, the *subdir*=*yes* value only affects the command it is entered on. When that command completes, the value reverts back to -*subdir*=*no*, the value at the beginning of the interactive session.

Parameters

Commands can have required parameters, optional parameters, or no parameters at all. Required parameters provide information to perform a task. The most commonly required parameter is a file specification. For example, if you want to archive a file named budget.fin from the /project directory, you would enter:

```
dsmc archive /project/budget.fin
```

Some commands have optional parameters. If you do not enter a value for an optional parameter, Tivoli Storage Manager uses the default value. For example, the **restore** command includes a required parameter, *sourcefilespec*, that specifies the path and file name in storage that you want to restore. The optional parameter, *destinationfilespec*, specifies the path and file name where you want to place the restored files. If you do not specify the *destinationfilespec*, by default Tivoli Storage Manager restores the files to the original source path. If you want to restore the files to a *different* directory, enter a value for *destinationfilespec*. For example, to restore the /project/budget.fin file to /newproj/newbudg.fin, enter:

```
dsmc restore /project/budget.fin /newproj/newbudg.fin
```

Enter parameters in the order indicated in the command syntax diagram.

File specification syntax

Use the following syntax rules when entering file specification parameters, such as *filespec*, *sourcefilespec*, and *destinationfilespec*:

- Do not use national language characters within the Tivoli Storage Manager command line client interactive mode. If a file specification contains national characters, process the command in batch mode, preceding it with the executable program name **dsmc**.
- If a file specification does not begin with a file space name (an opening directory delimiter), the file specification is assumed to be a subdirectory of the current working directory and Tivoli Storage Manager builds the fully qualified file specification. For example, if the current working directory is /home/me, then the *destinationfilespec* would be /home/me/mydir in the following command:

  ```
  dsmc restore "/fs/dir1/*" mydir/
  ```

- The only command that accepts a simple file space name is the **incremental** command. The following example is valid:

  ```
  dsmc i /fs
  ```

  The following example is *not* valid:

  ```
  dsmc sel /fs
  ```

- When entering the *sourcefilespec*, if the directory name ends with /, then /* is implied.

  When entering a *destinationfilespec*, if the name ends with /, then it is considered a directory, otherwise it is considered a file.

  The following example illustrates these two rules. Even though `mydir` and `yourdir` are directories, the command will fail because /* is implied after `mydir`, and `yourdir` is considered a file:

  ```
  restore /home/mydir/ /away/yourdir
  ```

  The following example illustrates the second rule. Even though `mydir` and `yourdir` are directories, the command will fail because `mydir` and `yourdir` are considered files:

  ```
  restore /home/mydir /away/yourdir
  ```

- Do not use wildcards as part of the file space name or anywhere in the *destinationfilespec*. The one exception to this rule is the **set access** command where wildcards are permitted in the two lowest-levels of the file spec. For example, to allow access to all files in all directories *in* and *below* the /home directory, enter:

  ```
  set access backup /home/* * *
  set access backup /home/*/* * *
  ```

Do not use wildcards for the directory path name, for example:

```
/home/j*asler/file1.c
```

- The maximum number of characters for a file name is 256. The maximum number of characters for a path name is 1024 characters.
- The maximum number of file specifications per command:
  - The Query commands can accept only one file specification.
  - The **restore** and **retrieve** commands can accept a *sourcefilespec* and a *destinationfilespec.*
  - You can specify as many file specifications on the **archive**, **incremental**, and **selective** commands as available resources or other operating system limits permit. You can also use the *filelist* option to process a list of files. The Tivoli Storage Manager client opens the file you specify with this option and processes the list of files within according to the specific command. See "Filelist" on page 212 for more information.

Notes:

1. You can overcome these limitations by using the *filelist* option to process a list of files. The Tivoli Storage Manager client opens the file you specify with this option and processes the list of files within according to the specific command. See "Filelist" on page 212 for more information.

2. You can also use the *removeoperandlimit* option to specify that Tivoli Storage Manager removes the 20-operand limit for UNIX-family platforms. If you specify the *removeoperandlimit* option with the **incremental**, **selective**, or **archive** commands, the 20-operand limit is not enforced and is restricted only by available resources or other operating system limits. See "Removeoperandlimit" on page 281

Remembering previous commands

If you set the *editor* option to *yes* in your client options file (dsm.opt), Tivoli Storage Manager permits you to recall and edit as many as 20 previously entered commands by using the Up arrow and Down arrow keys. If you set the *editor* option to *no*, the feature to recall previous commands is not active. If the editor and command retrieve functions are not working on a specific workstation setting, you should turn off the *editor* option. For more information regarding the *editor* option, see "Editor" on page 201.

Pressing the Up arrow key displays the previous command in memory. Pressing the Down arrow key displays the next command in memory. Table 63 lists other functions you can perform when you recall commands.

Note: Because of the limited functionality of the dtterm application, not all function keys of the command line clients operate as expected. The Control-Left and Control-Right combinations and the Home and End key do not work.

Table 63. Command recall and edit functions

Function	Press
Display the previous command in memory.	Up arrow
Display the next command in memory.	Down arrow
Move to the beginning of the command.	Home
Move to the end of the command.	End
Move to the left.	Left arrow
Move to the right.	Right arrow

Table 63. Command recall and edit functions (continued)

Function	Press
Move five spaces to the left.	Tab left
Move five spaces to the right.	Tab right
Move to the beginning of the previous word	Ctrl-left arrow or CTRL-L
Move to the beginning of the next word.	Ctrl-right arrow or CTRL-R
Delete a character to the right of the cursor.	Delete
Delete a character to the left of the cursor.	Backspace
Insert a character.	Toggle the Insert key
Erase to the end of the line.	Ctrl-delete or Ctrl-D
Finish or execute the command.	Enter
Quit the program.	F3 or Esc
End the program.	CTRL-C

Using wildcard characters

In a command, you can use wildcard characters in the file name or file extension *only*. You cannot use them to specify destination files, file systems, or directories. You cannot specify a directory whose name contains an asterisk (*) or a question Mark (?). Tivoli Storage Manager recognizes these characters only as wildcard characters. Use wildcard characters when you want to specify multiple files with similar names in *one* command. Without wildcard characters, you must repeat the command for each file. Valid wildcard characters that you can use include:

*   Asterisk. Matches zero or more characters.

?   Question mark. Matches any single character at the present position.

Table 64 shows examples of each wildcard.

Table 64. Wildcard characters

Pattern	Matches	Does not match
Asterisk (*)		
ab*	ab, abb, abxxx	a, b, aa, bb
ab*rs	abrs, abtrs, abrsrs	ars, aabrs, abrss
ab*ef*rs	abefrs, abefghrs	abefr, abers
abcd.*	abcd.c, abcd.txt	abcd, abcdc, abcdtxt
Question Mark (?)		
ab?	abc	ab, abab, abzzz
ab?rs	abfrs	abrs, abllrs
ab?ef?rs	abdefjrs	abefrs, abdefrs, abefjrs
ab??rs	abcdrs, abzzrs	abrs, abjrs, abkkkrs

Note: In batch mode, you must enclose values containing wildcards in double quotes. For example:

```
dsmc selective "/home/me/*.c"
```

Because the shell expands unquoted wildcards, it is easy to exceed the 20 operand limit in batch mode. It is more efficient to let the client process wildcard file specifications because many fewer server interactions are needed to complete the task.

Entering commands

Follow the general rules below when you enter commands:

- Enter a maximum of 256 characters on the command line. Enter the characters in a continuous string. If you press the return key, the command will process.
- When you enter options with a command, always precede the option with a dash (–).
- Enter more than one option in any order in a command before or after the file specification. Separate multiple options with a blank space.

Client commands reference

The following sections contain detailed information about each of the Tivoli Storage Manager commands. Information for each command includes:

- A description of the command.
- A syntax diagram of the command. The command name contains uppercase and lowercase characters. The uppercase characters indicate the minimum abbreviation you can use for the command name. See "Reading syntax diagrams" on page xiii for an explanation of these diagrams.
- Detailed descriptions of the command parameters. If the parameter is a constant (a value that does not change), the minimum abbreviation appears in uppercase letters.
- Examples of using the command.

Archive

The **archive** command archives a single file, selected files, or all files in a directory and its subdirectories on a server.

Archive files that you want to preserve in their current condition. To release storage space on your workstation, delete files as you archive them using the *deletefiles* option. Retrieve the archived files to your workstation whenever you need them again.

See "File system and ACL support" on page 72 for supported file systems and ACL support.

Removing operand limits
You can use the *removeoperandlimit* option to specify that Tivoli Storage Manager removes the 20-operand limit for UNIX-family platforms. If you specify the *removeoperandlimit* option with the **archive** command, the 20-operand limit is not enforced and is restricted only by available resources or other operating system limits. See "Removeoperandlimit" on page 281

Associating a local snapshot with a server file space
Use the *snapshotroot* option with the **archive** command in conjunction with a third-party application that provides a snapshot of a logical volume, to associate the data on the local snapshot with the real file space data that is stored on the Tivoli Storage Manager server. The *snapshotroot* option does not provide any facilities to take a volume snapshot, only to manage data created by a volume snapshot. See "Snapshotroot" on page 304 for more information.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
>>--Archive--------+--------+--+--------------+------------------><
                   |        |  |    filespec  |
                   +-options-+  +--"filespec"-+
```

Parameters

options

Table 65. Archive command: Related options

Option	Where to use	Page
archmc	Command line only.	169
archsymlinkasfile	Client user options file (dsm.opt) or command line.	170
changingretries	Client system options file (dsm.sys) or command line.	172
compressalways	Client user options file (dsm.opt) or command line.	180
compression	Client system options file (dsm.sys) *within* a server stanza or command line.	181
deletefiles	Command line only.	188
description	Command line only.	189

Table 65. Archive command: Related options (continued)

dirsonly	Command line only.	193
filelist	Command line only.	212
filesonly	Command line only.	215
preservelastaccessdate	Client user options file (dsm.opt) or command line.	274
removeoperandlimit	Command line only.	281
snapshotroot	Command line only.	304
subdir	Client user options file (dsm.opt) or command line.	307
tapeprompt	Client user options file (dsm.opt) or command line.	309
v2archive	Command line only.	328

filespec
> Specifies path and name of the file you want to archive. You can use wildcards to specify groups of files or all the files in a directory. See "Maximum file size for operations" on page 74 for the maximum file size for archive processing.

Examples

Task   Archive a single file named budget in the /home/proj1 directory.

> **Command:** `archive /home/proj1/budget`

Task   Archive all files in the /home/proj1 directory with a file extension of .txt.

> **Command:** `archive "/home/proj1/*.txt"`

Task   Archive all files in the directory tree headed by the /home directory.

> **Command:** `archive -subdir=yes "/home/*"`

Task   Assuming that you initiated a snapshot of the /usr file system and mounted the snapshot as /snapshot/day1, archive the /usr/dir1/sub1 directory tree from the local snapshot and manage it on the Tivoli Storage Manager server under the file space name /usr.

> **Command:** `dsmc archive /usr/dir1/sub1/ -subdir=yes -snapshotroot=/snapshot/day1`

Backup Group

Use the **backup group** command to create and back up a group containing a list of files from one or more file space origins to a virtual file space on the Tivoli Storage Manager server.

A *group backup* allows you to create a consistent point-in-time backup of a group of files that is managed as a single logical entity:

- All objects in the group are assigned to the same management class. See "Include options" on page 231 for more information about using the *include* option to bind a group to a management class.
- Existing *exclude* statements for any files in the group are ignored.
- All objects in the group are exported together.
- All objects in the group are expired together as specified in the management class. No objects in a group are expired until all other objects in the group are expired, even when another group they belong to gets expired.
- If you are performing full and differential group backups to a sequential device, during a restore the data will be in no more than two locations. To optimize restore time, perform periodic full backups to back up the data to one location on the sequential media.
- During a full group backup, all objects in the filelist are sent to the server. During a differential group backup, only data that has changed since the last full backup is sent to the server. Objects in the filelist that have not changed since the last full backup are assigned as members of the differential group backup. This data is not resent to the server, reducing backup time.

The **backup group** command requires the following options:

filelist Specifies a list of files to add to a new group. See "Filelist" on page 212 for more information.

groupname
: Specifies the fully qualified name of the group containing a list of files. See "Groupname" on page 221 for more information.

virtualfsname
: Specifies the name of the virtual file space for the group on which you want to perform the operation. See "Virtualfsname" on page 331 for more information.

mode Specifies whether you want to back up all of the files in the filelist or only files that have changed since the last full backup. See "Mode" on page 251 for more information.

Notes:

1. *If any file in the group backup fails, the entire group backup will fail.*
2. Use the **query group** command to query members of a group backup on the Tivoli Storage Manager server. See "Query Group" on page 392 for more information.
3. Use the **restore group** command to restore specific members or all members of a group backup on the Tivoli Storage Manager server. See "Restore Group" on page 413 for more information.

4. Use the **delete group** command to delete a specific group backup from the Tivoli Storage Manager server. See "Delete Group" on page 370 for more information.

5. Use the **query filespace** command to display virtual file space names for your node that are stored on the Tivoli Storage Manager server. See "Query Filespace" on page 390 for more information.

6. A group backup can be added to a backup set. See "Restoring data from a backup set" on page 109 for more information about backup sets.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──Backup GRoup─ options ───────────────────────────────────────────►◄
```

Parameters

options

Table 66. Backup Group command: Related options

Option	Where to use	Page
filelist	Command line only.	212
groupname	Command line only.	221
mode	Command line only.	251
virtualfsname	Command line only.	331

Examples

Task Perform a full backup of all the files in the /home/dir1/filelist1 file to the virtual file space name /virtfs containing the group leader /home/group1 file.

Command:
```
backup group -filelist=/home/dir1/filelist1 -groupname=group1
-virtualfsname=/virtfs -mode=full
```

Backup Image

The **backup image** command creates an image backup of one or more volumes on your system.

Notes:
1. For the Linux clients, image backup is only supported on partitions with id 0x83 or logical volumes created with the Linux Logical Volume Manager. Backing up other partitions, such as extended partitions that contain mounted file systems or database data, may produce inconsistent backup data if the data changes during the image backup operation.
2. Open file support, the usage of GPFS snapshot, and image backup is not supported for GPFS file systems on Linux86, Linux iSeries, and Linux pSeries.
3. Image backup of the Sun QFS and IBM TotalStorage SAN File Systems is not supported.
4. The Tivoli Storage Manager API must be installed to use the **backup image** command.

The Tivoli Storage Manager client must support the raw device type on the specific platform to perform an image backup of a raw device. You can only perform an image backup on local devices. Clustered devices or file systems as well as devices or file systems shared between two or more systems are not supported. If you want to perform an image backup for a file system mounted on a raw device, the raw device must be supported. See "Volume device type support for an image backup" on page 83 for specific information about supported devices for the **backup image** command.

Use the *include.image* option to include a file system or logical volume for image backup, or to specify volume-specific options for image backup.

The **backup image** command uses the *compression* option value specified in the dsm.sys. You can also specify the *compression* option with the **backup image** command.

Static, dynamic, and snapshot image backup

The traditional image backup prevents write access to the volume by other system applications during the operation. Use the *imagetype=dynamic* option to back up the volume *as is* without remounting it read-only. Corruption of the backup may occur if applications write to the volume while the backup is in progress. In this case, run **fsck** after a restore.

For Linux86 and Linux IA64 clients *only*: Tivoli Storage Manager performs a snapshot image backup of file systems residing on a logical volume created by the Linux Logical Volume Manager during which the volume is available to other system applications. Snapshot image backup requires a Version 5.1 Tivoli Storage Manager server.

You can use the *imagetype* option with the **backup image** command or the *include.image* option to specify whether to perform a static, dynamic, or snapshot image backup. See "Imagetype" on page 227 for more information.

The Linux Logical Volume Manager allows the creation of a snapshot of a logical volume while the logical volume itself is still online. The snapshot is created inside the same volume group as the source logical volume. You must ensure that the volume group provides enough free disk space to create the snapshot. The snapshot contains the old data blocks while the modified data is stored in the source logical volume. Use the *snapshotcachesize* option with the **backup image**

command, in the dsm.opt file, or with the *include.image* option to specify an appropriate snapshot size so that all old data blocks can be stored while the image backup occurs. A snapshot size of 100 percent will ensure a valid snapshot. See "Snapshotcachesize" on page 303 for more information.

Utilizing image backup to perform file system incremental backup

There are two methods of utilizing image backups to perform efficient incremental backups of your file system. These backup methods allow you to perform point-in-time restore of your file systems and improve backup and restore performance. You can perform the backup only on formatted volumes; not on raw logical volumes. You can use one of the following methods to perform image backups of volumes with mounted file systems.

Method 1 Using image backup with file system incremental:

1. Perform a full incremental backup of the file system, for example:

   ```
   dsmc incremental /myfilesystem
   ```

2. Perform an image backup of the same file system, for example:

   ```
   dsmc backup image /myfilesystem
   ```

3. Periodically, perform incremental backups, for example:

   ```
   dsmc incremental /myfilesystem
   ```

   You must follow these steps in the order shown to ensure that the server records additions and deletions accurately.

4. The following command restores the file system to its exact state as of the last incremental backup:

   ```
   dsmc restore image /myfilesystem -incremental -deletefiles
   ```

   During the restore, the client does the following:
   - Restores the most recent image on the server.
   - Deletes all of the files restored in the previous step which are inactive on the server. These are files which existed at the time of the image backup, but were subsequently deleted and recorded by a later incremental backup.
   - Restores new and changed files from the incremental backups.

If you do not follow the steps exactly, two things can occur:
- After the original image is restored, all files backed up with the **incremental** command are restored individually.
- If you perform a **backup image** before performing an **incremental**, files deleted from the original image are *not* deleted from the final restored file system.

Method 2 Using image backup with image incremental mode:

1. Perform an image backup of the same file system, for example:

   ```
   dsmc backup image /myfilesystem
   ```

2. Perform an incremental image backup of the file system, for example:

   ```
   dsmc backup image /myfilesystem -mode=incremental
   ```

   This sends only those files that were added or changed since the last image backup to the server. For more information, see "Mode" on page 251.

3. Periodically, perform full image backups, for example:

   ```
   dsmc backup image /myfilesystem
   ```

4. Restore the image as follows:

   ```
   dsmc restore image /myfilesystem -incremental
   ```

On restore, Tivoli Storage Manager ignores the ***deletefiles*** option when the image+image incremental technique of backing up has been used. The restore will include files that were deleted after the last full image backup plus the latest versions of files added or changed after the last image backup.

Note: You should perform full image backups periodically in the following cases:
- When a file system changes substantially (more than 40%), as indicated in step 3 of methods 1 and 2.
- Once each month.
- As appropriate for your environment.

This will improve restore time because fewer changes are applied from incrementals.

The following restrictions apply when using method 2:
- The file system can have no previous full incremental backups produced by the **incremental** command.
- Incremental-by-date image backup does not inactivate files on the server; therefore, when files are restored, none can be deleted.
- If this is the first image backup for the file system, a full image backup is performed.
- Using ***mode***=*incremental* backs up only files with a changed date, not files with changed permissions.
- If file systems are running at or near capacity, an out-of-space condition could result during the restore.

To help you decide which method is appropriate for your environment, see "Comparing methods 1 and 2" on page 85.

Supported Clients

This command is valid for AIX, HP-UX, all Linux clients, and Solaris.

Syntax
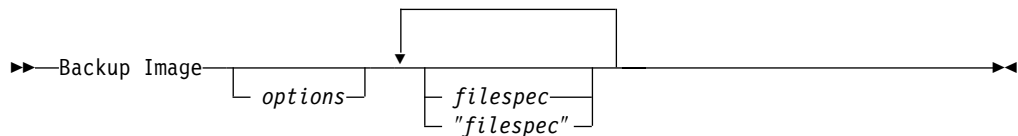
Parameters

options

Table 67. Backup Image command: Related options

Option	Where to use	Page
compressalways	Client user options file (dsm.opt) or command line.	180
compression	Client system options file (dsm.sys) or command line.	181
imagetype	Use with the **backup image** command or the ***include.image*** option in your client system options file (dsm.sys).	227
mode	Command line only.	251

Table 67. Backup Image command: Related options (continued)

snapshotcachesize	Use with the **backup image** command, the ***include.image*** option, or in the dsm.opt file.	303

filespec

Specifies the name of one or more logical volumes. If you want to back up more than one file system, separate their names with spaces. Do not use pattern matching characters. If you do not specify a volume name, the logical volumes specified with the ***domain.image*** option will process. If you do not use the ***domain.image*** option to specify file systems to process, an error message displays and no image backup occurs.

Specify the file space over which the logical volume is mounted or the logical volume name. If there is a file system configured in the system for a given volume, you cannot back up the volume with the device name. For example, if /dev/lv01 is mounted on /home you can issue `backup image /home` but backup image /dev/lv01 will fail with an error: `ANS1063E Invalid path specified`.

For Sun systems: Specify either a file system name or a raw device name (block device type).

Examples

Task   Back up the /home/test file space over which the logical volume is mounted and perform an image incremental backup that backs up only new and changed files after the last full image backup.

   Command: `dsmc backup image /home/test -mode=incremental`

Task   Perform a static image backup of the logical volume mounted at the /home directory.

   Command: `dsmc backup image /home -imagetype=static`

Task   Perform a snapshot image backup of the /home directory.

   Command: `dsmc backup image /home -imagetype=snapshot`

Task   Back up the /dev/lv01 raw logical volume.

   Command: `dsmc backup image /dev/lv01`

Backup NAS

The **backup nas** command creates an image backup of one or more file systems belonging to a Network Attached Storage (NAS) file server. The NAS file server performs the outboard data movement. A server process starts in order to perform the backup.

Use the *nasnodename* option to specify the node name for the NAS file server. When using an interactive command line session with a non-administrative ID, Tivoli Storage Manager prompts for an administrator ID. The NAS node name identifies the NAS file server to the Tivoli Storage Manager server; the NAS node name must be registered at the server. Place the *nasnodename* option in your client system options file (dsm.sys). The value in the client system options file is the default, but can be overridden on the command line. See "Nasnodename" on page 254 for more information.

Use the *toc* option with the **backup nas** command or the *include.fs.nas* option to specify whether Tivoli Storage Manager saves Table of Contents (TOC) information for each file system backup. See "Toc" on page 321 for more information. If you save TOC information, you can use the **query toc** server command to determine the contents of a file system backup in conjunction with the **restore node** server command to restore individual files or directory trees. You can also use the Tivoli Storage Manager Web client to examine the entire file system tree and select files and directories to restore. Creation of a TOC requires that you define the TOCDESTINATION attribute in the backup copy group for the management class to which this backup image is bound. Note that TOC creation requires additional processing, network resources, storage pool space, and possibly a mount point during the backup operation. If you do not save TOC information, you can still restore individual files or directory trees using the **restore node** server command, provided that you know the fully qualified name of each file or directory and the image in which that object was backed up. The *toc* option is only supported for images backed up by version 5.2 or later client and server.

Use the *mode* option to specify whether to perform a full or differential NAS image backup. A full image backup backs up the entire file system. The default is a differential NAS image backup on files that change after the last full image backup. If an eligible full image backup does not exist, a full image backup is performed. See "Mode" on page 251 for more information.

Use the *monitor* option to specify whether you want to monitor a NAS file system image backup and display processing information on your screen. See "Monitor" on page 253.

Use the **monitor process** command to display a list of all processes for which an administrative user ID has authority. The authorized administrative user ID should have at least client owner authority over both the NAS node and the client workstation node they are using either from command line or from the web.

Use the **cancel process** command to stop NAS back up processing. For more information, see "Cancel Process" on page 364.

Regardless of client platform, NAS file system specifications use the forward slash (/) separator, as in this example: /vol/vol0.

Supported Clients

This command is valid for AIX and Solaris clients only.

Syntax

```
►►──Backup NAS──┬──────────┬──┬──► filespec──┬─────────────────────────►◄
                └─ options ─┘                 
```
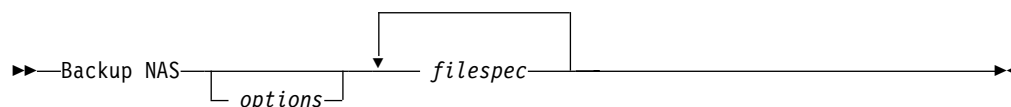
Parameters

options

Table 68. Backup NAS command: Related options

Option	Where to use	Page
mode	Command line only.	251
monitor	Command line only.	253
nasnodename	Client system options file (dsm.sys) or command line.	254
toc	Command line or with the ***include.fs.nas*** option in your client system options file (dsm.sys).	321

filespec
> Specifies the name of one or more file systems on the NAS file server. If you do not specify this parameter, Tivoli Storage Manager processes all of the file systems defined by the ***domain.nas*** option. For more information about this option, see "Domain.nas" on page 199.
>
> If you do not specify the *filespec* or the ***domain.nas*** option, the default *all-nas* value is used for ***domain.nas*** and all file systems on the NAS file server are backed up.

Examples

Task Perform the NAS image backup of the entire file system.

> **Command:** `backup nas -mode=full -nasnodename=nas1 /vol/vol0 /vol/vol2`

Task Perform the NAS image backup of the entire file server.

> **Command:** `backup nas -nasnodename=nas1`

Task Perform the NAS image backup of the entire file system and save Table of Contents (TOC) information for the file system backup.

> **Command:** `backup nas -mode=full -nasnodename=netappsj /vol/vol0 -toc=yes`

Backup WAS

Root User

The **backup was** command specifies whether to back up the WebSphere Application Server (WAS) Network Deployment Manager (contains setup, application files, and configuration information) or the Application Server (also contains setup, application files, and configuration information) to the Tivoli Storage Manager server. You can back up both the Network Deployment Manager and the Application Server using separate sessions.

Notes:

1. If WAS security is enabled, user name and password validation for Data Protection for WebSphere Application Server is required. To avoid backup failure, you *must* use the **set waspassword** command to set the user name and password for each installation of WAS on your machine. You only need to perform this task once, unless you change your WAS user name or password. See "Set Waspassword" on page 433 for more information.

   To determine if WAS security is enabled, enter the following command:

   ```
   dsmc query was -wast=local
   ```

   Tivoli Storage Manager displays the WAS security status under the **Sec** heading.
2. Multiple backup sessions of the same node are not supported.
3. Use the *mode* option to specify whether to perform a full (the default) or differential backup. See "Mode" on page 251 for more information.
4. Use the *wastype* option to specify whether to back up the Network Deployment Manager (ND) or Application Server (APP) associated with the node name of the instance of WAS that you want to back up. The default is ND. See "Wastype" on page 340 for more information.
5. Use the *include* option in your client system options file (dsm.sys) to assign a management class to a WAS group backup. For example:
   - For the Network Deployment Manager: include /WAS_ND_NDNODE mgmtclass
   - For the Application Server: include /WAS_APPNODE mgmtclass
6. WAS backups can also be added to a backup set. See "Restoring data from a backup set" on page 109 for more information about WAS backups.

Supported Clients

This command is valid for AIX, Solaris, and Linux86 clients.

Syntax

```
►►──Backup WAs──────────────── ──nodename──────────────────────────►◄
              └─ options ─┘
```

Parameters

options

Table 69. Backup WAS command: Related options

Option	Where to use	Page
mode	Command line only.	251

Table 69. Backup WAS command: Related options (continued)

wastype	Command line only.	340

nodename
>   Specifies the node name of the instance of WAS to back up. This is a required
>   parameter.

Examples

Task   Back up the Network Deployment Manager associated with the node name
           wasnode.

>   **Command:** `backup was wasnode`

Task   Back up the Application Server associated with the node name and
           instance *ednode_instance1*.

>   **Command:** `backup was ednode_instance1 -wastype=app`

Task   Perform a differential backup of the Network Deployment Manager
           associated with the node name and instance *ednode_instance2*.

>   **Command:** `backup was ednode_instance2 -wastype=nd`
>   `-mode=differential`

Cancel Process

The **cancel process** command displays a list of current NAS (if NDMP support is enabled) image backup and restore processes for which the administrative user has authority. From the list, the administrative user can select one process to cancel. Client owner privilege is sufficient authority to cancel the selected NAS image backup or restore processes.

When using an interactive command line session with a non-administrative ID, Tivoli Storage Manager prompts for an administrator ID.

Note: If you use the **cancel process** command on the initial command line, no server contact is made and no password is needed.

Supported Clients

This command is valid for AIX and Solaris clients only.

Syntax

```
►►──Cancel Process──────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Examples

Task   Cancel current NAS image backup or restore processes.

Command: `cancel process`

Cancel Restore

The **cancel restore** command displays a list of your restartable restore sessions in the server database. You can only cancel one restartable restore session at a time. Run the **cancel restore** command again to cancel additional restores. To restart restartable restore sessions, use the **restart restore** command.

Use the **cancel restore** command when:
- You cannot back up files affected by the restartable restore.
- Restartable restore sessions lock the file space so that files cannot be moved off of the server's sequential volumes.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──Cancel Restore────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Examples

Task   Cancel a restore operation.

Command: `cancel restore`

Delete Access

The **delete access** command deletes authorization rules for files or images that are stored on the server. When you delete an authorization rule, you revoke user access to any files or images specified by that rule.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──Delete ACcess─────────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Examples

Task   Display a list of current authorization rules and select the rules you want to delete.

Command: `delete access`

See the following screen example:

```
Index   Type      Node    Owner   Path

1       Backup    NODE1   USER1   home/dev/proja/list/
2       Archive   NODE3   LUIE    home/fin/budg/depta/
3       Backup    NODE4   USER2   home/plan/exp/deptc/
4       Archive   NODE5   USER2S  home/mfg/invn/parta/
Enter Index of rule(s) to delete, or quit to cancel:
```

To delete the authorization rules that let **luie** and **user2s** access your files or images, type: **2 4** or **(2,4)** and press Enter.

Delete Archive

The **delete archive** command deletes archived files from Tivoli Storage Manager server storage. Your administrator must give you authority to delete archived files.

Attention: When you delete archived files, *you cannot retrieve them.* Verify that the files are obsolete *before* you delete them.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──Delete ARchive───────────────── filespec ──────────────────────►◄
                   └─ options ─┘  └─ "filespec" ─┘
```

Parameters

options

Table 70. Delete Archive command: Related options

Option	Where to use	Page
dateformat	Client user options file (dsm.opt) or command line.	184
description	Command line only.	189
filelist	Command line only.	212
noprompt	Command line only.	259
numberformat	Client user options file (dsm.opt) or command line.	260
pick	Command line only.	267
subdir	Client user options file (dsm.opt) or command line.	307
tapeprompt	Client user options file (dsm.opt) or command line,	309
timeformat	Client user options file (dsm.opt) or command line.	319

filespec
> Specifies the path and file name that you want to delete from storage. Use wildcard characters to specify a group of files or all files in a directory.

Examples

Task   Delete a file named budget.

> **Command:** `delete archive /user/home/proj1/budget`

Task   Delete all files archived from the /user/home/proj1 directory with a file extension of `.txt`.

> **Command:** `del arch "/user/home/proj1/*.txt"`

Task   Delete files archived from the /user/project directory using the **pick** option to display a list of archive copies that match the file specification. From the list, you can select the versions to process.

> **Command:** `delete archive "/user/project/*" -pick`

Delete Filespace

Authorized User

The **delete filespace** command deletes file spaces in Tivoli Storage Manager server storage. A *file space* is a logical space on the server that contains files or images you backed up or archived. Tivoli Storage Manager assigns a separate file space on the server for each workstation file system from which you back up or archive files. The file space name is the same as the file system name. When you enter the **delete filespace** command, a list of your file spaces displays. From this list, select the file space that you want to delete.

Your administrator must give you authority to delete a file space. You need BACKDEL authority if the file space you want to delete contains backup versions, or ARCHDEL authority if the file space contains archive copies. If the file space contains *both* backup versions and archive copies, you need both types of authority.

Deleting NAS file spaces
You can use the **delete filespace** command to interactively delete NAS file spaces from server storage.

Use the *nasnodename* option to identify the NAS file server. When using an interactive command line session with a non-administrative ID, Tivoli Storage Manager prompts for an administrator ID. Place the *nasnodename* option in your client system options file (dsm.sys). The value in the client system options file is the default, but this value can be overridden on the command line. If the *nasnodename* option is not specified in the client system options file, you must specify this option on the command line when processing NAS file systems. See "Nasnodename" on page 254 for more information.

Use the *class* option to specify the class of the file space to delete. To display a list of file spaces belonging to a NAS node so that you may choose one to delete, use the -*class*=*nas* option. Using the default, -*class*=*client*, will not change the current **delete filespace** behavior. See "Class" on page 173 for more information.

To delete NAS file spaces using the Web client, see Chapter 4, "Backing up your data," on page 69.

Deleting WebSphere Application Server (WAS) file spaces
Use the **delete filespace** command to delete a WAS file space on the Tivoli Storage Manager server.

Use the **delete group** command to delete WAS group backups on the Tivoli Storage Manager server. See "Delete Group" on page 370 for more information.

Attention: When you delete a file space, you delete *all* backup versions and archive copies within that file space. When you delete a file space, *you cannot restore the files or images*. Verify that the files or images are obsolete *before* you delete them.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──Delete Filespace──────────────────────────────────────────────►◄
                    └─ options ─┘
```
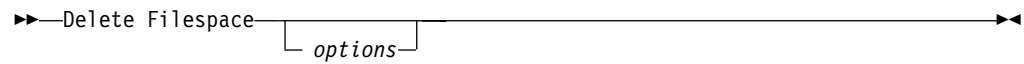
Parameters

options

Table 71. Delete Filespace command: Related options

Option	Where to use	Page
class	Command line only.	173
detail	Command line only.	191
nasnodename	Client system options file (dsm.sys) or command line.	254
scrolllines	Client user options file (dsm.opt) or command line.	294
scrollprompt	Client user options file (dsm.opt) or command line.	295

Examples

Task   Delete a file space.

        Command: `delete filespace`

Task   Delete NAS file spaces from the **dagordon** NAS file server stored on the server.

        Command: `delete filespace -nasnodename=dagordon -class=nas`

Task   Delete WAS file spaces stored on the server.

        Command: `delete filespace`

Delete Group

Authorized User

Use the **delete group** command to delete a group backup on the Tivoli Storage Manager server. You can also delete WAS group backups using this command.

After deleting a group, the group leader (virtualfsname) remains on the Tivoli Storage Manager server. It contains no members (file or directories) but is reported in a subsequent **query filespace** command. It will have no files listed if the *showmembers* option is added. Deleting a group does not remove the file space that it resides in because there may be other groups in it. Use **delete filespace** if you want to remove the file space and all the data it contains.

Notes:

1. Use the *inactive* option to display both active and inactive group backup versions. By default, Tivoli Storage Manager only displays active versions. See "Inactive" on page 229 for more information.

2. Use the *pick* option to select a specific group to delete from the Tivoli Storage Manager server. See "Pick" on page 267 for more information.

3. Use the *noprompt* option if you want to suppress the confirmation prompt that normally appears before you delete a group backup version. By default, Tivoli Storage Manager prompts you for confirmation before deleting the group backup. Using this option can speed up the delete procedure. However, it also increases the danger of accidentally deleting a group backup version that you want to save. Use this option with caution. See "Noprompt" on page 259 for more information.

4. Use the **query filespace** command to display virtual file space names for your node that are stored on the Tivoli Storage Manager server. See "Query Filespace" on page 390 for more information.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──Delete GRoup─ filespec ─┬─────────────┬──────────────────►◄
                            └─ options ─┘
```

Parameters

filespec
    Specifies the virtual file space name and the group name on the server that you want to delete.

options

Table 72. Delete Group command: Related options

Option	Where to use	Page
inactive	Command line only.	229
noprompt	Command line only.	259
pick	Command line only.	267
pitdate	Command line only.	268

Table 72. Delete Group command: Related options (continued)

pittime	Command line only.	269

Examples

Task Delete the current active version of the /vfs/group1 group.

Command:

```
delete group /vfs/group1
```

Task Delete a backup version of the /vfs/group1 group from a list of active and inactive versions.

Command:

```
delete group /vfs/group1 -inactive -pick
```

Task Delete the current active APP/ND WAS group.

Command: `delete group /WAS_APPNODE/WASGROUP`

Task Delete a backup version of the WAS ND/APP group from a list of active and inactive versions.

Command: `delete group /WAS_ND_NDNODE/WASGROUP -inactive -pick`

Expire

The **expire** command inactivates the backup objects you specify in the file specification or with the *filelist* option.

When working in interactive mode, a prompt notifies you before files are expired.

The **expire** command does not remove workstation files. If you expire a file or directory that still exists on your workstation, the file or directory is backed up again during the next incremental backup unless you exclude the object from backup processing.

If you expire a directory that contains active files, those files will not appear in a subsequent query from the GUI. However, these files will display on the command line if you specify the proper query with a wildcard character for the directory.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──EXPire──────┬─────────┬──── filespec ──────────────────────────────────►◄
                └ options ┘
```

Parameters

options

Table 73. Expire command: Related options

Option	Where to use	Page
dateformat	Client user options file (dsm.opt) or command line.	184
filelist	Command line only.	212
noprompt	Command line only.	259
numberformat	Client user options file (dsm.opt) or command line.	260
pick	Command line only.	267
timeformat	Client user options file (dsm.opt) or command line.	319

Note: If you specify *filelist*, then *pick* is ignored.

filespec
Specifies a path and a filename that you want to expire. You can enter only one file specification on this command. However, you can use wildcards to select a group of files or all the files in a directory. If you specify the *filelist* option, the `filespec` designation is ignored.

Examples

Task   Inactivate the letter1.txt file in the home directory.

Command: `expire "u/home/letter1.txt"`

Task   Inactivate all files in the admin/mydir directory.

Command: `expire u/admin/mydir/*`

Task   Inactivate all files in the */home/avi/filelist.txt* file.

        Command: `expire -filelist=/home/avi/filelist.txt`

Help

The **help** command displays a Table of Contents of help topics for the command line client. Enter the number of the topic that you want to view. If there is more than one screen of topics, scroll backward or forward through the list. To exit, type **q** and press Enter.

Note: If you use the **help** command on the initial command line, no server contact is made and no password is needed.

Supported Clients

This command is valid for all UNIX clients.

Syntax

►►──Help──►◄

Parameters

There are no parameters for this command.

Examples

Task   Display a list of help topics.

Command: help

Incremental

The **incremental** command backs up all new or changed files or directories in the default client domain or from file systems, directories, or files you specify, unless you exclude them from backup services.

To incrementally back up selected files or directories, enter a file specification in the command. If you do not enter a file specification, the default is to back up files or directories in the default domain. See "Domain" on page 194 for information on how to change which objects are included in the default domain.

The following attributes in the management class assigned to the file or directory affect whether the data is actually backed up:

Frequency
> The number of days that must elapse between successive backups for the file. The **frequency** attribute applies only to a full incremental backup.

Mode Permits you to back up only files that changed since the last backup (*modified*) or back up the files whether they changed or not (*absolute*).

Serialization
> Permits or denies backup of files or directories according to the following values:
> * **static**: In order to be backed up, data must not be modified during backup or archive.
> * **shared static**: If data in the file or directory changes during each of the allowed attempts to back up or archive it, it is not backed up or archived. The value of the *changingretries* option determines how many attempts are made. The default is 4.
> * **dynamic**: The object is backed up or archived on the first attempt whether or not data changes during the process.
> * **shared dynamic**: The object is backed up or archived on the last attempt, even if data changes during the process.

For more information on management classes, see Chapter 8, "Understanding storage management policies," on page 135.

Using the *include* option in an include-exclude list, you can override″ the default management class for a file or group of files.

You can perform either a *full incremental* backup or an *incremental by date* backup. The default is a full incremental backup.

You can also use the **selective** command to perform a *selective* backup that backs up only the files, directories or empty directories that you specify regardless of whether they have changed. For more information, see "Selective" on page 427.

A full incremental backs up all files or directories that are new or have changed since the last incremental backup. During a full incremental backup, the client queries the server to determine the exact condition of your storage. Tivoli Storage Manager uses this information to:
* Back up new files or directories.
* Back up files or directories whose contents have changed.
* Mark inactive backup versions on the server for files or directories that are deleted from the workstation.
* Rebind backup versions to management classes if the management class assignments change.

Removing operand limits

You can use the *removeoperandlimit* option to specify that Tivoli Storage Manager removes the 20-operand limit for UNIX-family platforms. If you specify the *removeoperandlimit* option with the **incremental** command, the 20-operand limit is not enforced and is restricted only by available resources or other operating system limits. See "Removeoperandlimit" on page 281

Incremental-by-Date

An incremental-by-date backup backs up new and changed files with a modification date later than the date of the last incremental backup stored at the server, unless the files are excluded from backup by an **exclude** statement.

If an incremental-by-date is performed on only part of a file system, the date of the last full incremental is not updated, and the next incremental-by-date will back up these files again. Changes to the access control lists (ACL) are not backed up during an incremental-by-date. Use the **query filespace** command to determine the date and time of the last incremental backup of the entire file system.

To perform an incremental-by-date backup, use the *incrbydate* option with the **incremental** command.

Unlike a full incremental, an incremental-by-date does not maintain current server storage of *all* your workstation files because:
- It does not expire backup versions of files that are deleted from the workstation.
- It does not rebind backup versions to a new management class if the management class has changed.
- It does not back up files with attributes that have changed, unless the modification dates and times have also changed.
- It ignores the copy group frequency attribute of management classes.

For these reasons, if you have limited time during the week to perform backups, but extra time on the weekends, you can perform an incremental-by-date backup on weekdays and a full incremental backup on weekends to maintain current server storage of your workstation files.

If the **incremental** command is retried because of a communication failure or session loss, the transfer statistics will display the number of bytes Tivoli Storage Manager attempted to transfer during *all* command attempts. Therefore, the statistics for bytes transferred may not match the file statistics, such as those for file size.

Associating a local snapshot with a server file space

Use the *snapshotroot* option with the **incremental** command in conjunction with a third-party application that provides a snapshot of a logical volume, to associate the data on the local snapshot with the real file space data that is stored on the Tivoli Storage Manager server. The *snapshotroot* option does not provide any facilities to take a volume snapshot, only to manage data created by a volume snapshot. See "Snapshotroot" on page 304 for more information.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
 ▶▶──Incremental──┬──────────┬──┬──┬───────────┬───┬──────────────────▶◀
                  └─options─┘  │  ├──filespec───┤   │
                              │  └──"filespec"──┘   │
                              └────────◀────────────┘
```
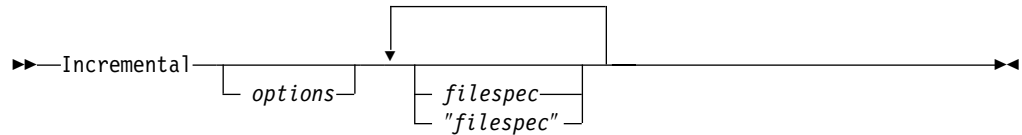
Parameters

options

Table 74. Incremental command: Related options

Option	Where to use	Page
changingretries	Client system options file (dsm.sys) or command line.	172
compressalways	Client user options file (dsm.opt) or command line.	180
compression	Client system options file (dsm.sys) *within* a server stanza or command line.	181
dirsonly	Command line only.	193
domain	Client system options file (dsm.sys) or the client user options file (dsm.opt) or command line only.	194
filelist	Command line only.	212
filesonly	Command line only.	215
incrbydate	Command line only.	235
memoryefficientbackup	Client user options file (dsm.opt) or command line.	250
preservelastaccessdate	Client user options file (dsm.opt) or command line.	274
removeoperandlimit	Command line only.	281
snapshotroot	Command line only.	304
subdir	Client user options file (dsm.opt) or command line.	307
tapeprompt	Client user options file (dsm.opt) or command line.	309

filespec
> Specifies the path and file name that you want to back up. Use wildcards to select a group of files or all the files in a directory. If you do not specify a file specification, the default domain or the domain specified as an option is backed up. See "Maximum file size for operations" on page 74 for the maximum file size for back up processing.

> If you specify a file system, all new and changed files are backed up. In addition, the last incremental date for the file space is updated on the server. If you specify a file or directory, the last incremental date is not updated. This means the file or directory might be backed up again if a later backup is performed using the *incrbydate* option.

> If you specify a file system, specify the file system without a trailing slash.

Examples

Task   Run an incremental backup of the default client domain specified in your client user options file (dsm.opt).

> **Command:** Incremental

Task   Run an incremental backup for the /home, /usr, and /proj file systems.

Command: `Incremental /home /usr /proj`

Task   Run an incremental backup for the /proj/test directory.

Command: `Incremental /proj/test/`

Task   Run an incremental-by-date backup for the /home file system.

Command: `Incremental -incrbydate /home`

Task   Run an incremental backup of the abc file in the /fs/dir1 directory.

Command: `Incremental -subdir=yes /fs/dir1/abc`

Task   Run an incremental backup of the directory object /fs/dir1, but not any of the files in the /fs/dir1 directory.

Command: `Incremental /fs/dir1`

Task   Run an incremental backup of the directory object /fs/dir1 and all of the files in the /fs/dir1 directory.

Command: `Incremental -subdir=yes /fs/dir1/`

Task   Assuming that you initiated a snapshot of the /usr file system and mounted the snapshot as /snapshot/day1, run an incremental backup of all files and directories under the local snapshot and manage them on the Tivoli Storage Manager server under the file space name /usr .

Command: `dsmc inc /usr -snapshotroot=/snapshot/day1`

Loop

The **loop** command starts an interactive command line session that is maintained until you enter **quit**.

If you are required to enter a password, you will be prompted for it before the loop mode prompt appears.

Note: It is no longer possible to enter loop mode without a valid server contact. One of the consequences is that certain commands, such as `restore backupset -location=file`, will only be accepted on the initial command line when a valid server is not available.

In an interactive command line session, it is unnecessary to precede each command name with **dsmc** and your password, if one is required.

In interactive mode, options you enter on the initial command line will override the value that you specified in your client user options file (dsm.opt) or client system options file (dsm.sys). This value remains in effect for the entire interactive session unless overridden by a different value on a given interactive command. For example, if you set the *subdir* option to *yes* in your client user options file (dsm.opt), and you specify -*subdir*=*no* on the initial command line, the -*subdir*=*no* setting remains in effect for the entire interactive session unless overridden by the -*subdir*=*yes* value on a given interactive command. However, the *subdir*=*yes* value only affects the command it is entered on. When that command completes, the value reverts back to -*subdir*=*no*, the value at the beginning of the interactive session.

You can enter all valid commands in interactive mode *except* the **schedule** and **loop** commands.

There are some options that you cannot use in the interactive session created by the **loop** command and are identified in the option description by this statement: *This option is valid only on the initial command line. It is not valid in interactive mode.*

See Chapter 9, "Using processing options," on page 145 for options that you cannot use in interactive mode.

Notes:
1. In loop mode, following a restore operation directly from tape, the mount point is not released in case additional restore requests are made to that volume. If you request a backup operation in the same session and that mount point is the only one available, the backup operation will stop with the following message:

   ```
   Waiting for mount of offline media
   ```

   In this case, the mount point is not released until one of the following conditions is met:
   - The device class MOUNTRETENTION limit is satisfied.
   - The client idletimeout period is satisfied.
   - The dsmc loop session is closed after the restore operation completes, allowing you to start a subsequent loop mode session to perform the backup operation.

2. In interactive mode, you cannot enter a file specification that contains national language characters. If a command contains national characters, process the command in batch mode by preceding the command with the executable program name, **dsmc**.

Supported Clients

This command is valid for all UNIX clients.

Syntax

►►──LOOP───►◄

Parameters

There are no parameters for this command.

Examples

Task   Start an interactive command line session.

Command: dsmc

At the **tsm>** prompt, enter a command.

Macro

The **macro** command executes a series of commands that you specify in a macro file. By including the **macro** command within a macro file, you can nest as many as ten levels of commands.

Comment lines are not supported within the macro file that you specify for the **macro** command.

Supported Clients

This command is valid for all UNIX clients.

Syntax

►►──MAcro─ *macroname*──►◄

Parameters

macroname
    Specifies the fully qualified name of the file containing the commands.

Examples

The following is an example of how to use the **macro** command.

Task   Selectively back up files in the following directories:
```
/devel/project/proja
/devel/project/projb
/devel/project/projc
```

Command: `macro backabc.mac`

where `backabc.mac` contains the following statements:
```
Selective /devel/project/proja/
Selective /devel/project/projb/
Selective /devel/project/projc/
```

Monitor Process

The **monitor process** command displays a list of current NAS (if NDMP support is enabled) image backup and restore processes for which the administrative user has authority. The administrative user can then select one process to monitor. Client owner privilege is sufficient authority to monitor the selected NAS image backup or restore processes.

When using an interactive command line session with a non-administrative ID, Tivoli Storage Manager prompts for an administrator ID.

Supported Clients

This command is valid for AIX and Solaris clients only.

Syntax

```
►►──MONitor Process──────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Examples

Task   Monitor current NAS image backup or restore processes.

Command: `monitor process`

Query Access

The **query access** command displays a list of users to whom you have given access to backup versions or archive copies of specific files. Tivoli Storage Manager displays a list of authorization rules that you defined with the **set access** command or with *Node Access List* on the graphical user interface (GUI) Utilities menu. The information includes:

- Authority you gave a user to restore backup versions or retrieve archive copies.
- The node name of the user to whom you gave authorization.
- The ID of the user at that node to whom you gave authorization.
- The files to which the user has access.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──Query ACcess────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Examples

Task   Display a list of users who have access to your files.

        Command: `query access`

Query Archive

The **query archive** command displays a list of your archived files and the following information about each file:
- File size
- Archive date
- File specification
- Expiration date
- Archive description

If you use the *detail* option with the **query archive** command, the client displays the following additional information:
- Last modification date
- Last access date

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──Query ARchive─────────────┬─ filespec ─────────────────────────►◄
                  └─ options ─┘   └─ "filespec" ─┘
```

Parameters

options

Table 75. Query Archive command: Related options

Option	Where to use	Page
dateformat	Client user options file (dsm.opt) or command line.	184
description	Command line only.	189
detail	Command line only.	191
dirsonly	Command line only.	193
filelist	Command line only.	212
filesonly	Command line only.	215
fromdate	Command line only.	217
fromnode	Command line only.	218
fromowner	Command line only.	219
fromtime	Command line only.	220
numberformat	Client user options file (dsm.opt) or command line.	260
scrolllines	Client user options file (dsm.opt) or command line.	294
scrollprompt	Client user options file (dsm.opt) or command line.	295
subdir	Client user options file (dsm.opt) or command line.	307
timeformat	Client user options file (dsm.opt) or command line.	319
todate	Command line only.	323
totime	Command line only.	324

filespec

Specifies the path and file name that you want to query. Use wildcard

characters to specify a group of files or all the files in a directory. If you use wildcard characters, enclose the file specification in double quotation marks. Specify an asterisk (*) to query all archived files in the current directory.

Examples

Task Display a list of all your archived files in the current working directory.

Command: `q archive "*"`

Task Display a list of all your archived files in the /devel directory and all of its subdirectories.

Command: `query archive "/devel/*" -subdir=yes`

Task Display a list of all your archived files in the current directory. Use the *dateformat* and *timeformat* options to reformat the dates and times.

Command: `q ar —date=5 —time=1 "*"`

Task Display a list of all your archived files in the current directory. Use the *detail* option to display the last modification date and the last access date of each file.

Command: `q ar -detail "*"`

Task Display a list of archived files in the /home/proj directory whose first four characters of the file name begin with proj.

Command: `q ar "/home/proj/proj*"`

Query Backup

The **query backup** command displays a list of backup versions of your files. File information includes the following:
- File specification
- File size
- Backup date
- Whether the file is active or inactive
- The management class assigned to the file. Only the first ten characters of the management class name appear.

If you use the *detail* option with the **query archive** command, the client displays the following additional information:
- Last modification date
- Last access date

Querying NAS file system images

You can use the **query backup** command to display information about file system images backed up for a NAS file server.

Use the *nasnodename* option to identify the NAS file server to query. When using an interactive command line session with a non-administrative ID, Tivoli Storage Manager prompts for an administrator ID. Place the *nasnodename* option in your client system options file (dsm.sys). The value in the client system options file is the default, but this value can be overridden on the command line. See "Nasnodename" on page 254 for more information.

Use the *class* option to specify the class of the file space to query. To display a list of images belonging to a NAS node, use the *-class*=*nas* option. Using the default *-class*=*client* option will not change the current **query backup** behavior. See "Class" on page 173 for more information.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──Query Backup──┬─────────┬──┬─ filespec ──┬──────────────────────►◄
                  └─options─┘  └─"filespec"──┘
```

Parameters

options

Table 76. Query Backup command: Related options

Option	Where to use	Page
class	Command line only.	173
dateformat	Client user options file (dsm.opt) or command line.	184
detail	Command line only.	191
dirsonly	Command line only.	193
filelist	Command line only.	212
filesonly	Command line only.	215

Table 76. Query Backup command: Related options (continued)

fromdate	Command line only.	217
fromnode	Command line only.	218
fromowner	Command line only.	219
fromtime	Command line only.	220
inactive	Command line only.	229
nasnodename	Client system options file (dsm.sys) or command line.	254
numberformat	Client user options file (dsm.opt) or command line.	260
pitdate	Command line only.	268
pittime	Command line only.	269
scrolllines	Client user options file (dsm.opt) or command line.	294
scrollprompt	Client user options file (dsm.opt) or command line.	295
subdir	Client user options file (dsm.opt) or command line.	307
timeformat	Client user options file (dsm.opt) or command line.	319
todate	Command line only.	323
totime	Command line only.	324

filespec
> Specifies the path and file name that you want to query. Use wildcard characters to specify a group of files or all the files in a directory. If you use wildcard characters, enclose the file specification in double quotation marks. Specify an asterisk (*) to display information about backup versions for all of your files in the current directory. Do not use wild cards when you query NAS file system images with -*class*=*nas* option.

Examples

Task Display a list of all active and inactive backup versions of your files in the current directory.

> **Command:** `query backup —inactive "*"`

Task Display a list of all your backups in the current directory. Use the ***detail*** option to display the last modification date and the last access date of each file.

> **Command:** `q backup -detail "*"`

Task Display a list of files that were backed up from the /home/proj directory with file names that begin with proj. Use the ***dateformat*** and ***timeformat*** options.

> **Command:** `q b —date=1 —time=4 "/home/proj/proj*"`

Task Display a list of active and inactive backup file versions in the /home file system. Use the ***dateformat*** and ***timeformat*** options.

> **Command:** `q b —date=5 —time=1 —ina —su=yes /home/`

Task Query file system images from the **nas2** NAS file server.

> **Command:** `query backup -nasnodename=nas2 -class=nas`

Query Backupset

The **query backupset** command queries a backup set from a local file, tape device, or the Tivoli Storage Manager server. See "Location" on page 244 for information on specifying locally-resident backup sets. This command displays the backup set name, generation date, retention, and description.

You can use this command to query backup sets on a tape device with AIX, Solaris, and HP-UX clients only.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──Query BACKUPSET─┬──────────┬─┬─ backupsetname ─┬─────────────────►◄
                    └─options──┘ └─ filename ──────┘
```

Parameters

options

Table 77. Query Backupset command: Related options

Option	Where to use	Page
description	Command line only.	189
location	Command line only.	244
scrolllines	Client user options file (dsm.opt) or command line.	294
scrollprompt	Client user options file (dsm.opt) or command line.	295

backupsetname
> Specifies the name of the backup set on the server you want to query when -*location*=*server* is in effect. You can use wildcards to specify the backup set name. If you use wildcards or do not specify a backup set name, all backup sets that you own display on the screen. When a backup set is created, the server assigns root as the owner of the backup set. When querying a backup set on the server, a non-root user will not see the backup set listed, even if they know the backup set name and use it in the query.

filename
> Specifies the file name on your local workstation that contains the backup set you want to query when -*location*=*file* is in effect.

Examples

Task   Query a backup set called `mybackupsetname` on the server.

> **Command:** `query backupset "mybackupsetname" -loc=server`

Task   Query the backup set in the backupsetfile.name file in the budget directory.

> **Command:** `dsmc query backupset "/home/budget/backupsetfile.name" -loc=file`

Task   Query the backup set on the /dev/rmt0 tape device.

Command: `dsmc query backupset /dev/rmt0 -loc=tape`

Query Filespace

The **query filespace** command displays a list of file spaces for a node that are stored on the Tivoli Storage Manager server. You can also specify a single file space name to query. A *file space* is a logical space on the server that contains files you backed up or archived. Tivoli Storage Manager assigns a separate file space on the server for each file system at your workstation from which you back up or archive files. The file space name is the same as the file system name.

Querying NAS file spaces

Use the ***nasnodename*** option to identify the NAS file server to query. When using an interactive command line session with a non-administrative ID, Tivoli Storage Manager prompts for an administrator ID. Place the ***nasnodename*** option in your client system options file (dsm.sys). The value in the client system options file is the default, but this value can be overridden on the command line. If the ***nasnodename*** option is not specified in the client system options file, it must be specified on the command line when processing NAS file systems. See "Nasnodename" on page 254 for more information.

Use the ***class*** option to specify the class of the object to query. To display a list of file spaces belonging to a NAS node, use the *-**class**=nas* option. Using the default, *-**class**=client*, will not change the current **query filespace** behavior. See "Class" on page 173 for more information.

Supported Clients

This command is valid for all UNIX clients.

Syntax

►►──Query Filespace──►◄
           └─ *filespacename* ─┘ └─ *options* ─┘
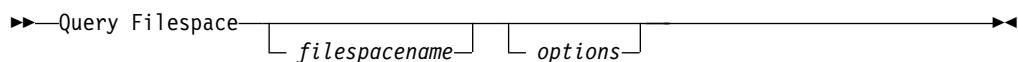
Parameters

filespacename
> Specifies an optional character string which can include wildcards. Use this argument to specify a subset of file spaces. The default is to display all file spaces.

options

Table 78. Query Filespace command: Related options

Option	Where to use	Page
class	Command line only.	173
dateformat	Client user options file (dsm.opt) or command line.	184
detail	Command line only.	191
fromnode	Command line only.	218
fromowner	Command line only.	219
nasnodename	Client system options file (dsm.sys) or command line.	254
scrolllines	Client user options file (dsm.opt) or command line.	294
scrollprompt	Client user options file (dsm.opt) or command line.	295
timeformat	Client user options file (dsm.opt) or command line.	319

Examples

Task   Display your file spaces.

        Command: query filespace

Task   Display your file spaces. Use the *dateformat* and *timeformat* options to reformat the dates and times.

        Command: `query filespace –date=5 –time=4`

Task   Display the ⁄home file space.

        Command: `query filespace /home`

Task   Display file space names that include the pattern `smith`.

        Command: `query filespace "*smith*"`

Task   Query a file space from the **nas2** NAS file server.

        Command: `query filespace -nasnodename=nas2 –class=nas`

Query Group

Authorized User

Use the **query group** command to display information about a group backup and its members.

Notes:

1. Use the *pick* option to display a list of groups from which you can select one group to query.
2. Use the *showmembers* option to display and select individual group members that you want to query. The *showmembers* option is not valid with the *inactive* option. If you want to display members of a group that are not currently active, use the *pitdate* and *pittime* options to specify the backup date and time of the member you want to query.
3. Use the **query filespace** command to display virtual file space names for your node that are stored on the Tivoli Storage Manager server. See "Query Filespace" on page 390 for more information.
4. If you perform a full and differential group backup, a query of this group using the -*inactive* option displays two active backups of the same name, one of type FULL and one of type DIFF. These backups inactivate any previous full and differential backups:

```
Size       Backup Date          Mgmt Class  A/I Type File
----       -----------          ----------  --- ---- ----
433  B  10/09/2002 14:40:07     NOARCH       A  FULL VFS/GROUP1
433  B  10/10/2002 07:58:43     NOARCH       A  DIFF VFS/GROUP1
433  B  10/09/2002 14:39:58     NOARCH       I  FULL VFS/GROUP1
433  B  10/09/2002 14:39:53     NOARCH       I  DIFF VFS/GROUP1
```

If you query a group backup without the -*inactive* option, the query displays only the latest group backup, whether it is type FULL or type DIFF:

```
Size       Backup Date          Mgmt Class A/I Type File
----       -----------          ---------- --- ---- ----
433  B  10/10/2002 07:58:43     NOARCH      A  DIFF VFS/GROUP1
```

Supported Clients

This option is valid for all UNIX clients.

Syntax

```
►►──query group─ filespec─┬──────────┬──────────────────────────────►◄
                          └─ options─┘
```

Parameters

options

Table 79. Query Group command: Related options

Option	Where to use	Page
fromnode	Command line only.	218
fromowner	Command line only.	219

Table 79. Query Group command: Related options (continued)

inactive	Command line only.	229
pitdate	Command line only.	268
pittime	Command line only.	269
showmembers	Command line only.	302

filespec
>   Specifies the virtual file space name and the group name on the server that
>   you want to query.

Examples

Task   Display all the groups in the /vfs file space.

>   **Command:**
>
>   ```
>   query group /vfs/*
>   ```

Task   Display active and inactive versions of the /vfs/group1 filespec.

>   **Command:**
>
>   ```
>   query group /vfs/group1 -inactive
>   ```

Task   Display the /vfs/group1 filespec. Use the ***showmembers*** option to display
>   a list of group members from which you can select one or more to query.

>   **Command:**
>
>   ```
>   query backup /vfs/group1 -showmembers
>   ```

Query Image

The **query image** command displays the following information about file system images backed up by a client:

- Image Size - This is the volume size which was backed up.
- Stored Size - This is the actual image size stored on the server. The stored image on the Tivoli Storage Manager server is the same size as the volume capacity.
- File system type
- Backup date and time
- Management class assigned to image backup
- Whether the image backup is an active or inactive copy
- The image name

Note: The Tivoli Storage Manager API must be installed to use the **query image** command.

Supported Clients

This command is valid for AIX, HP-UX, all Linux clients, and Solaris.

Syntax

```
►►──Query Image──┬─────────┬──┬─logicalvolumename─┬────────────────────►◄
                 └─options─┘  └─filespacename─────┘
```

Parameters

options

Table 80. Query Image command: Related options

Option	Where to use	Page
dateformat	Client user option file (dsm.opt) or command line.	184
fromnode	Command line only.	218
fromowner	Command line only	219
inactive	Command line only.	229
numberformat	Client user option file (dsm.opt) or command line.	260
pitdate	Command line only.	268
pittime	Command line only.	269
scrolllines	Client user options file (dsm.opt) or command line.	294
scrollprompt	Client user options file (dsm.opt) or command line.	295
timeformat	Client user option file (dsm.opt) or command line.	319

logicalvolumename
> The name of a logical volume you want to query. You must specify the exact name of the image. You cannot use wildcards. The default is all active images (unless restricted by one or more options).

filespacename
> Specifies the file system name that you want to query.

> Omitting *logicalvolumename* and *filespacename* causes all images to display.

Examples

Task   Display all backed up images.

        Command: `q image`

Task   Display all backed up images owned by **kutras** at node avalon.

        Command: `query image -fromnode=avalon -fromowner=kutras`

Task   Display active and inactive version of the ⁄usr image.

        Command: `q i /usr -inactive`

Query Inclexcl

The **query inclexcl** command displays a list of include-exclude statements in the order in which they are processed during backup and archive operations. The list displays the type of option, the scope of the option (archive, all, etc.), and the name of the source file.

You can test the validity of patterns you wish to use in your include-exclude list before you actually insert them in your options file. See the *test pattern* explanation below.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──Query INCLexcl──┬──────────────────┬──────────────────────────►◄
                    └──test pattern────┘
```

Parameters

test pattern
  Use for testing the validity of patterns you wish to use in your include-exclude list. When you use a test pattern with this command, the following occurs:
  - The internal include-exclude list is *not* displayed
  - The pattern is processed as if it had come from an include-exclude statement, including all the usual error checking
  - The pattern is displayed as it would appear in the include-exclude list

  If the test pattern has no errors, the compiled pattern result is the same as the test pattern.

Examples

Task   Display a list of include-exclude statements.

   Command: `query inclexcl`

Task   Test the validity of this pattern: /.../?x?/*.log

   Command: `query inclexcl /.../?x?/*.log`

Query Mgmtclass

The **query mgmtclass** command displays information about the management classes available in your active policy set.

Your administrator defines management classes that contain attributes controlling whether a file is eligible for backup or archive services. Management classes also determine how backups and archives are managed on the server.

Your active policy set contains a default management class; it can contain any number of additional management classes. You can assign specific management classes to files using *include* options that are located in the client user options file (dsm.opt). If you do not assign a management class to a file, Tivoli Storage Manager uses the default management class.

When you archive files, you can override the assigned management class by using the *archmc* option.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──Query Mgmtclass───────────────────────────────────►◄
                     └─ options ─┘
```

Parameters

options

Table 81. Query Mgmtclass command: Related options

Option	Where to use	Page
detail	Command line only.	191
fromnode	Command line only.	218

Examples

Task   Display default and available management classes.

       Command: `query mgmtclass`

Query Node

The **query node** command displays all the nodes for which an administrative user ID has authority to perform operations. The authorized administrative user ID should have at least client owner authority over the client workstation node they are using either from command line or from the web.

When using an interactive command line session with a non-administrative ID, Tivoli Storage Manager prompts for an administrator ID.

Use the *type* option to specify the type of node to filter for. Valid values are *nas, client, server,* and *any*. The default is *any*. See "Type" on page 326 for more information.

Supported Clients

This command is valid for AIX and Solaris clients only.

Syntax

```
►►──Query Node──┬─────────┬──────────────────────────────────────►◄
                └─options─┘
```

Parameters

options

Table 82. Query Node command: Related options

Option	Where to use	Page
type	Command line only.	326
scrolllines	Client user options file (dsm.opt) or command line.	294
scrollprompt	Client user options file (dsm.opt) or command line.	295

Examples

Task   Display all NAS nodes.

Command: `query node -type=nas`

Query Options

Use the **query options** command to display all or part of your options and their current settings.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──Query Options─────────────── pattern ───────────────────────►◄
                    └─ options ─┘
```
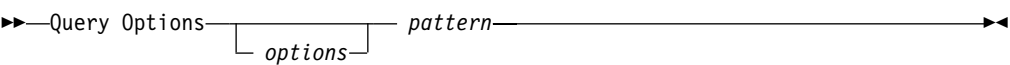
Parameters

pattern
> An optional character string which can include wildcards. Use this argument to specify a subset of options. The default is to display all options.

options

Table 83. Query Options command: Related options

Option	Where to use	Page
scrolllines	Client user options file (dsm.opt) or command line.	294
scrollprompt	Client user options file (dsm.opt) or command line.	295

Examples

Task   Display all options and their values.

        Command: `query options`

Task   Display only options beginning with *comm*.

        Command: `query options comm*`

Task   Display the value of the *replace* option.

        Command: `query options replace`

Query Restore

The **query restore** command displays a list of your restartable restore sessions in the server database. The list contains these fields: owner, replace, subdir, preservepath, source, and destination.

A restartable restore session is created when a wildcard restore command fails because of network outage, client failure, server outage, or a similar problem. When such a failure occurs, the file space is locked on the server and its files cannot be moved off the server's sequential volumes. To unlock the file space, either restart the restore and allow it to complete (**restart restore** command), or cancel the restore (**cancel restore** command). Use **query restore** to determine if you have any restartable restore sessions and which file spaces are affected.

Supported Clients

This command is valid for all UNIX clients.

Syntax

►►──Query Restore───►◄

Parameters

There are no parameters for this command.

Examples

Task   Display your restartable restore session in the server database.

Command: `query restore`

Query Schedule

The **query schedule** command displays the events scheduled for your node. Your administrator can set up schedules to perform automatic backups and archives for you. To plan your work, use this command to determine when the next scheduled events occur.

Supported Clients

This command is valid for all UNIX clients.

Syntax

►►──Query SChedule───►◄

Parameters

There are no parameters for this command.

Examples

Task   Display your scheduled events.

      Command: `query schedule`

Query Session

The **query session** command displays information about your session, including the current node name, when the session was established, server information, and server connection information.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──Query SEssion────────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Examples

Task   Display your session information.

Command: `query session`

A sample **query session** display follows:

```
Tivoli Storage Manager
Command Line Backup Client Interface - Version 5, Release 1,
Level 0.0 (C) Copyright IBM Corporation, 1990, 2002 All
Rights Reserved.

Node Name: EPSILON3
Session established with server FIJI_0918GA: AIX-RS/6000
  Server Version 5, Release 1, Lev. 0.0
  Server date/time: 03/04/2002 15:09:52
  Last access: 03/04/2002 15:09:40

Server Connection Information

Server Name.............: FIJI_0918GA
Server Type.............: AIX-RS/6000
Server Version..........: Ver. 5, Rel. 1, Lev. 0.0
Last Access Date........: 09/04/1999 15:09:40
Delete Backup Files.....: Yes
Delete Archive Files....: Yes

Node Name...............: EPSILON3
User Name...............: thompson
```

Query Systeminfo

Use the **query systeminfo** command to gather information on one or more of the following items and output this information to a file or the console:

- DSMOPTFILE - The contents of dsm.opt file.
- DSMSYSFILE - The contents of the dsm.sys file.
- ENV - Environment variables.
- ERRORLOG - The Tivoli Storage Manager error log file.
- FILE - Attributes for the file name that you specify.
- INCLEXCL - Compiles a list of include-exclude in the order in which they are processed during backup and archive operations.
- OPTIONS - Compiled options.
- OSINFO - Name and version of the client operating system (includes ULIMIT information for UNIX).
- POLICY - Policy set dump.
- SCHEDLOG - The contents of the Tivoli Storage Manager schedule log (usually dsmsched.log).
- CLUSTER - AIX cluster information.

Notes:

1. Use the *filename* option to specify a file name in which to store the information gathered from the items you specify. If you do not specify a file name, by default the information is stored in the dsminfo.txt file . See "Filename" on page 214 for more information.

2. Use the *console* option if you want to output the information to the console. See "Console" on page 183 for more information.

   Note: This command is intended primarily as an aid for IBM support to assist in diagnosing problems, although users who are familiar with the concepts addressed by this information may also find it useful. If you use the *console* option, no special formatting of the output is performed to accommodate screen height or width. Therefore, the console output may be difficult to read due to length and line-wrapping. In this case, it is recommended that you use the *filename* option with the **query systeminfo** command to allow the output to be written to a file that can subsequently be submitted to IBM support.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──Query SYSTEMInfo──┬──▼── item ──┬──────────────────────►◄
                      │     ▲        │
                      └─────────────┘
                         └─ options ─┘
```
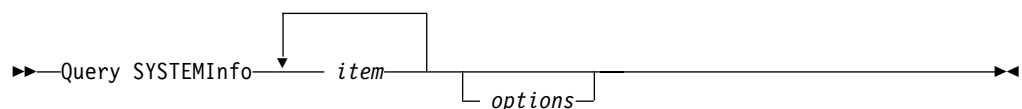
Parameters

item

Specifies one or more items from which you want to gather information and output the information to the file name that you specify with the **filename** option or to the console.

options

Table 84. Query Systeminfo command: Related options

Option	Where to use	Page
console	Command line only.	183
filename	Command line only.	214

Examples

Task   Gather and store the contents of the dsm.opt file and the Tivoli Storage Manager error log file in the tsminfo.txt file.

Command: `query systeminfo dsmoptfile errorlog -filename=tsminfo.txt`

Query WAS

Authorized User

Use the **query was** command to display backups of the WebSphere Application Server (WAS) Network Deployment Manager (contains setup, application files, and configuration information) or the Application Server that match the node name and type of the WAS group backup that you specify.

Use the *wastype* option to specify whether to query the Network Deployment Manager (ND), Application Server (APP), or both (ANY), that are associated with the node name of the instance of WAS that you want to query. The default is ANY. You can also set the *wastype* option to LOCAL to query all the instances of the Application server and Network Deployment Manager on your local machine. See "Wastype" on page 340 for more information.

Supported Clients

This command is valid for AIX, Solaris, and Linux86 clients.

Syntax

```
►►──Query WAs─────────────── ─nodename──────────────────────────►◄
              └─ options ─┘
```

Parameters

options

Table 85. Query WAS command: Related options

Option	Where to use	Page
fromnode	Command line only.	218
fromowner	Command line only	219
inactive	Command line only.	229
pitdate	Command line only.	268
pittime	Command line only.	269
showmembers	Command line only.	302
wastype	Command line only.	340

nodename
Specifies the node name of the group that you want to query. If you do not specify a node name, Tivoli Storage Manager queries all WAS backups.

Examples

Task   Query all WAS backups (Network Deployment Manager and Application Server) on the Tivoli Storage Manager server.

Command: `query was -ina -wastype=any`

Task   Query the group backups of the Network Deployment Manager associated with the node name *wasnode*. Use the ***showmembers*** option to display a list of group members from which you can select one or more to query.

Command: `query was wasnode -showmembers`

Restart Restore

The **restart restore** command displays a list of your restartable restore sessions in the server database. You can only restart one restartable restore session at a time. Run the **restart restore** command again to restart additional restores.

The restarted restore uses the same options you used in the failed restore. The restarted restore continues from the point at which the restore previously failed.

To cancel restartable restore sessions, use the **cancel restore** command. Use the **restart restore** command when:

- Restartable restore sessions lock the file space at the server so that files cannot be moved off the server's sequential volumes.
- You cannot back up files affected by the restartable restore.

Options from the failed session supersede new or changed options for the restarted session.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──RESTArt Restore──────────────────────────────────────────────►◄
```

Parameters

There are no parameters for this command.

Examples

Task   Restart a restore.

Command: `restart restore`

Restore

The **restore** command obtains copies of backup versions of your files from a Tivoli Storage Manager server. To restore files, specify the directories or selected files, or select the files from a list. Restore files to the directory from which you backed them up or to a different directory. Tivoli Storage Manager uses the ***preservepath*** option with the *subtree* value as the default for restoring files. For more information, see "Preservepath" on page 276.

See "File system and ACL support" on page 72 for supported file systems and ACL support.

Note: On UNIX systems when a symbolic link is created its modification time is set to the current system time and cannot be changed. So, when restoring a symbolic link its modification date and time is set to the date and time of the restore, not to the date and time the link had when it was backed up. As a result, Tivoli Storage Manager will back up the symbolic link during the next incremental backup because its modification time changed since the last backup.

If you set the ***subdir*** option to *yes* when restoring a specific path and file, Tivoli Storage Manager recursively restores *all* subdirectories under that path, and any instances of the specified file that exist under *any* of those subdirectories.

When you restore an entire directory or directory tree, and you do not specify the ***inactive***, ***latest***, ***pick***, ***todate***, and ***fromdate*** options on the **restore** command, Tivoli Storage Manager tracks which objects are restored. If the restore process is interrupted for any reason, you can restart the restore at the point of interruption by entering the **restart restore** command. It is possible to create more than one restartable restore session. Restores are only restartable if the *filespec* is fully wildcarded. For example, for a restore which is restartable, enter:

```
dsmc rest /home/* -sub=yes
```

For a restore which is not restartable, enter:

```
dsmc rest /home/file?.c -sub=yes
```

Use the **query restore** command to display a list of your restartable restore sessions in the server database. Further backups of the file system cannot be performed unless the restartable restore completes using the **restart restore** command or is cancelled using the **cancel restore** command.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
              ┌─ FILE ─┐
►►──REStore───┼────────┼──────────┬─ sourcefilespec ────┬──►
              └─ options ─┘       └─ "sourcefilespec" ─┘

►──┬────────────────────────┬──►◄
   └─ destinationfilespec ─┘
```
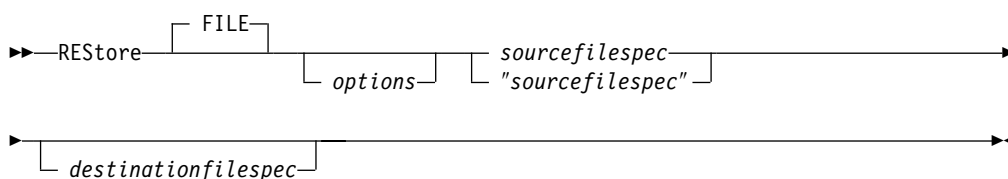
Parameters

file

> This parameter specifies that the source file specification is an explicit file name. This parameter is required when you restore a file name from the current path, when you do not specify a relative or absolute path, and when the file name conflicts with one of the reserved **restore** command keywords, such as **restore** *backupset*.

options

Table 86. Restore command: Related options

Option	Where to use	Page
dateformat	Client user options file (dsm.opt) or command line.	184
dirsonly	Command line only.	193
filelist	Command line only.	212
filesonly	Command line only.	215
followsymbolic	Client user options file (dsm.opt) or command line.	216
fromdate	Command line only.	217
fromnode	Command line only.	218
fromowner	Command line only.	219
fromtime	Command line only.	220
ifnewer	Command line only.	225
inactive	Command line only.	229
latest	Command line only.	242
numberformat	Client user options file (dsm.opt) or command line.	260
pick	Command line only.	267
pitdate	Command line only.	268
pittime	Command line only.	269
preservepath	Command line only.	276
replace	Client user options file (dsm.opt) or command line.	282
subdir	Client user options file (dsm.opt) or command line.	307
tapeprompt	Client user options file (dsm.opt) or command line.	309
timeformat	Client user options file (dsm.opt) or command line.	319
todate	Command line only.	323
totime	Command line only.	324

sourcefilespec

> Specifies the path and file name in storage that you want to restore. Use wildcard characters to specify a group of files or all the files in a directory.

destinationfilespec

> Specifies the path and file name where you want to place the restored files. If you do not specify a destination, Tivoli Storage Manager restores the files to the original source path.

> **Note:** If you do not specify a destination, Tivoli Storage Manager determines whether the original file system can be reached. If the original file system cannot be reached, Tivoli Storage Manager will not restore the

file. This failure can also occur if you remove the ***virtualmountpoint*** option from the dsm.sys file. In this case, you can specify a different destination or restore the original ***virtualmountpoint*** option to the dsm.sys file, restart the client, and retry the command.

Examples

Task   Restore a single file named budget in the /Users/user1/Documents directory.

Command: `restore /home/devel/projecta/budget`

Task   Restore a single file named budget which resides in the current directory.

Command: `restore file budget`

Task   Restore all files with a file extension of .c from the /home/devel/projecta directory.

Command: `restore "/home/devel/projecta/*.c"`

Task   Restore files in the /user/project directory. Use the ***pick*** and ***inactive*** options to select active and inactive backup versions.

Command: `restore "/user/project/*" -pick -inactive`

Task   Restore all files from the /home/devel/projecta directory that end with the character .c to the /home/newdevel/projectn/projecta directory. If the projectn or the projectn/projecta directory does not exist, it is created.

Command: `restore "/home/devel/projecta/*.c"`
`/home/newdevel/projectn/`

Task   Restore all files in the /home/mydir directory to their state as of 1:00 PM on August 17, 2002.

Command: `restore -pitd=8/17/2002 -pitt=13:00:00 /home/mydir/`

Task   Restore all objects in the /home/myid/ directory. Since this restore is fully wildcarded, if the restore process is interrupted, a restartable restore session is created. Use the **restart restore** command to restart a restartable restore session. Use the **cancel restore** command to cancel a restartable restore session.

Command: `res /home/myid/*`

Task   Restore files specified in the filelist to a different location.

Command: `res -filelist=/home/avi/restorelist.txt`
`/home/NewRestoreLocation/`

Restore Backupset

The **restore backupset** command restores a backup set from the server, a local file, or a local tape device.

Use the *location* option with the **restore backupset** command to specify where Tivoli Storage Manager searches for a backup set during the restore operation. See "Location" on page 244 for more information.

If you are restoring a file space from a backup set to a system that did not perform the original backup, you may need to:
- Specify a destination
- Use the syntax below to specify the source file
- Do both of the above

```
dsmc restore backupset backupsetname {/fsname}/* /destfs/ -subdir=yes
```

You can restore a group from a backup set with the following considerations:
- You must set the *subdir* option to *yes*.
- The *sourcefilespec* must be the virtual file space name , followed with a terminating directory delimiter. For example:

```
restore backupset mybackupset /virtfs/* /home/devel/projectb/
-loc=server -subdir=yes
```

    The entire group, or groups in the virtual file space will be restored. You cannot restore a partial group by specifying a qualified source file space.
- If you want to restore a local backup set, the virtual file space is not a known real file system on the local system, so the *sourcefilespec* must be enclosed in {} braces, followed with a terminating directory delimiter. For example:

```
restore backupset mybackupset {/virtfs}/* /home/devel/projectb/
-loc=file -subdir=yes
```

Considerations:
- You must be a root user to restore an entire backup set from the server, otherwise only files you own are restored.
- If you are unable to restore a backup set from portable media, check with your Tivoli Storage Manager administrator to ensure that the portable media was created on a device using a compatible format.
- If you use the **restore backupset** command on the initial command line and you set the *location* option to *tape* or *file*, no attempt is made to contact the server.
- There is no support in the API for the backup set format. Therefore, backup set data that was backed up via the API cannot be restored or used.
- If the object you want to restore is part of a backup set generated on a node, and the node name is changed on the server, any backup set objects that were generated prior to the name change will not match the new node name. Ensure that the node name is the same as the node for which the backup set was generated.

Restoring backup sets in a SAN environment

You can restore backup sets in a storage area network (SAN) in the following ways:
- If the backup set is on a SAN-attached storage device, specify the device using the *filename* parameter and use the *location=tape* option. Tivoli Storage Manager restores the backup set directly from the SAN-attached storage device, gaining high-speed restore performance.

> **Note:** You must ensure that the correct tape is mounted in the SAN-attached tape drive prior to issuing the **restore** command. The backup-archive client will not initiate a SCSI autochanger to mount the tape automatically.
- If the backup set is not on local media or a SAN-attached storage device, you can specify the backup set using the *backupsetname* parameter. Use the *location*=*server* option to restore the backup set directly from the server via the LAN.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──REStore BACKUPSET──┬─────────┬──┬─ backupsetname ─┬──┬─ sourcefilespec ──┬──►
                       └─options─┘  └─ filename ──────┘  └─ "sourcefilespec" ─┘

►──┬────────────────────┬──────────────────────────────────────────────────►◄
   └─ destinationfilespec ─┘
```
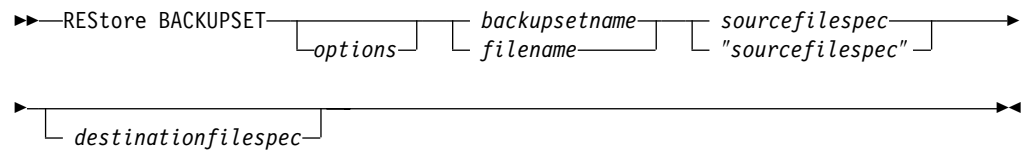
Parameters

options

Table 87. Restore Backupset command: Related options

Option	Where to use	Page
dirsonly	Command line only.	193
filesonly	Command line only.	215
ifnewer	Command line only.	225
location	Command line only.	244
preservepath	Command line only.	276
quiet	Client user options file (dsm.opt) or command line.	280
replace	Client user options file (dsm.opt) or command line.	282
subdir	Client user options file (dsm.opt) or command line.	307

backupsetname
> Specifies the name of the backup set on the server from which to perform a restore operation. You cannot use wildcard characters to specify the backup set name. Tivoli Storage Manager restores the backup set from the server via LAN. If the backup set contains files from several owners, the backup set itself will be owned by root, and non-root users will not see the backup set. In this case, non-root users can restore their files by obtaining the backup set name from the Tivoli Storage Manager administrator.

filename
> Specifies the name of a local file or device from which to perform a restore operation.

sourcefilespec
> Specifies the source path which can be a portion of the backup set. The default is to restore the entire backup set.

destinationfilespec
> Specifies the destination path for the restored files. If you do not specify a

sourcefilespec, you cannot specify a *destinationfilespec*. If you do not specify a destination, Tivoli Storage Manager restores the files to the original source path. If you are restoring more than one file, you must end the specification with a directory delimiter (/), otherwise, Tivoli Storage Manager assumes the last name is a file name and reports an error. If you are restoring a single file, you can optionally end the specification with a file name if you want to give the restored file a new name.

Examples

Task   Restore a backup set called mybackupsetname from the server.

   Command: `dsmc restore backupset mybackupsetname -loc=server`

Task   Restore the backup set contained in the backupsetfile.name file in the budget directory.

   Command: `dsmc restore backupset "/home/budget/backupsetfile.name" -loc=file`

Task   Restore a backup set from the /dev/rmt0 device.

   Command: `dsmc restore backupset "/dev/rmt0" -loc=tape`

Task   Restore a single file named budget.dev from the /dev/rmt0 device, to the original source path.

   Command: `dsmc restore backupset /dev/rmt0 "/home/jones/budget.dev" -loc=tape`

Task   Restore all files in the budget directory that contain a file extension of .txt from the tape(s) on the /dev/rmt0 device, to the original source path.

   Command: `dsmc restore backupset /dev/rmt0 "/home/budget/*.txt" -loc=tape`

Task   Restore the backup set **bset01.001** from the Tivoli Storage Manager server.

   Command: `dsmc restore backupset bset01.001 -loc=server`

Task   Restore a group from the backup set **mybackupset** on the Tivoli Storage Manager server to the /home/devel/projectb directory.

   Command:`restore backupset mybackupset /virtfs/ /home/devel/projectb/ -loc=server -subdir=yes`

Task   Restore a group from the local backup set **mybackupset** to the /home/devel/projectb/ directory.

   Command:`restore backupset mybackupset {/virtfs}/ /home/devel/projectb/ -loc=server -subdir=yes`

Task   Restore the backup set contained in local file ″/home/jones/bset01.file″.

   Command: `dsmc restore backupset "/home/jones/bset01.file" -loc=file`

Restore Group

Authorized User

Use the **restore group** command to restore specific members or all members of a group backup.

Notes:

1. Use the *pick* option to display a list of groups from which you can select one group to restore.

2. Use the *showmembers* option with the *pick* option to display and restore one or more members of a group. In this case, you first select the group from which you want to restore specific members, then you select one or more group members to restore.

3. You can restore a group from a backup set. See "Restore Backupset" on page 410 for more information.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──restore group──┬──────────┬── sourcefilespec ──┬─────────────────────┬──►◄
                   └ options ┘                     └ destinationfilespec ┘
```

Parameters

options

Table 88. Restore Group command: Related options

Option	Where to use	Page
followsymbolic	Client user options file (dsm.opt) or command line.	216
fromdate	Command line only.	217
fromnode	Command line only.	218
fromowner	Command line only.	219
fromtime	Command line only.	220
ifnewer	Command line only.	225
inactive	Command line only.	229
latest	Command line only.	242
pick	Command line only.	267
pitdate	Command line only.	268
pittime	Command line only.	269
replace	Client user options file (dsm.opt) or command line.	282
showmembers	Command line only.	302
tapeprompt	Client user options file (dsm.opt) or command line.	309
todate	Command line only.	323
totime	Command line only.	324

sourcefilespec
> Specifies the virtual file space name and the group name on the server that you want to restore.

destinationfilespec
> Specifies the path where you want to place the group or one or more group members. If you do not specify a destination, the client restores the files to their original location.

Examples

Task Restore all members in the /virtfs/group1 group backup to their original location on the client machine.

> **Command:**
>
> ```
> restore group /virtfs/group1
> ```

Task Display all groups within the /virtfs virtual file space. Use the ***showmembers*** option to display a list of group members from which you can select one or more to restore.

> **Command:**
>
> ```
> restore group /virtfs/* -pick -showmembers
> ```

Task Display a list of groups within the /virtfs virtual file space from which you can select one or more groups to restore.

> **Command:**
>
> ```
> restore group /virtfs/* -pick
> ```

Restore Image

The **restore image** command restores a file system or raw volume image that was backed up using the **backup image** command. This command can restore an active base image, or a point-in-time base image, with associated incremental updates.

You can use the *verifyimage* option with the **restore image** command to specify that you want to enable detection of bad sectors on the destination target volume. If bad sectors are detected on the target volume, Tivoli Storage Manager issues a warning message on the console and in the error log. See "Verifyimage" on page 330 for more information.

If bad sectors are present on the target volume, you can use the *imagetofile* option with the **restore image** command to specify that you want to restore the source image to a file. Later, you can use a 'dd' utility (available on UNIX) or its equivalent to copy data from this file to a logical volume. See "Imagetofile" on page 226 for more information.

Considerations:
- The API must be installed to use the **restore image** command.
- Image restore of the Sun QFS file system is not supported.
- Image restore is not supported for GPFS file systems on Linux86, Linux iSeries, and Linux pSeries.
- If you use the *pick* option, the following information is displayed for file system images backed up by the client:
  – Image Size
  – Stored Size - This is the actual image size stored on the server. The stored image on the Tivoli Storage Manager server is the same size as the volume capacity.
  – File system type
  – Backup date and time
  – Management class assigned to image backup
  – Whether the image backup is an active or inactive copy
  – The image name
- If for some reason a restored image is corrupted, you can use the **fsck** tool to attempt to repair the image.

Supported Clients

This command is valid for AIX, HP-UX, all Linux clients, and Solaris.

Syntax

```
►►──REStore Image──┬──────────┬──┬─ sourcefilespec ──┬──────────────────►
                   └─ options ─┘  └─ "sourcefilespec" ─┘

►──┬───────────────────────┬──►◄
   └─ destinationfilespec ──┘
```

Parameters

options

Table 89. Restore Image command: Related options

Option	Where to use	Page
dateformat	Client user option file (dsm.opt) or command line.	184
deletefiles	Command line only.	188
fromnode	Command line only.	218
fromowner	Command line only.	219
imagetofile	Command line only.	226
inactive	Command line only.	229
incremental	Command line only.	236
noprompt	Command line only.	259
pick	Command line only.	267
pitdate	Command line only.	268
pittime	Command line only.	269
timeformat	Client user option file (dsm.opt) or command line.	319
verifyimage	Command line only.	330

sourcefilespec
> Specifies the name of a source image file system to be restored. Only a single source image may be specified; you cannot use wildcard characters.

destinationfilespec
> Specifies the name of an existing mounted file system or the path and file name to which the source file system will be restored. The default is the original location of the file system.

The **restore image** command does not define or mount the destination file space. The destination volume must exist, must be large enough to hold the source, and if it contains a file system, must be mounted. If an image backup contains a file system, and you restore them to a different location, be aware of the following points:

- If the destination volume is smaller than the source volume, the operation will fail.
- If the destination volume is larger than the source, after the restore operation you will *lose* the difference between the sizes. The lost space can be recovered by increasing the size of the volume. This will also increase the size of the restored volume.

Examples

Task Restore the /home/test directory over which the logical volume is mounted, to its original location.

> **Command:** `dsmc rest image /home/test`

Task Restore the /home/proj directory over which the logical volume is mounted, to its original location and apply the changes from the last incremental backup of the original image recorded at the server. The changes include deletion of files.

Command: `dsmc restore image /home/proj -incremental -deletefiles`

Task   Restore the /usr file system to its original location. Use the ***verifyimage*** option to enable detection of bad sectors on the target volume.

Command: `dsmc restore image /usr -verifyimage`

Task   If bad sectors present on the target volume, use the ***imagetofile*** option to restore the /usr file system to the /home/usr.img file to avoid data corruption.

Command: `dsmc restore image /usr /home/usr.img -imagetofile`

Restore NAS

The **restore nas** command restores the image of a file system belonging to a Network Attached Storage (NAS) file server. The NAS file server performs the outboard data movement. A server process performs the restore.

If you used the *toc* option with the **backup nas** command or the *include.fs.nas* option to save Table of Contents (TOC) information for each file system backup, you can use the **query toc** server command to determine the contents of a file system backup in conjunction with the **restore node** server command to restore individual files or directory trees. You can also use the Web client to examine the entire file system tree and select files and directories to restore. If you do not save TOC information, you can still restore individual files or directory trees using the **restore node** server command, provided that you know the fully qualified name of each file or directory and the image in which that object was backed up.

Use the *nasnodename* option to specify the node name for the NAS file server. When using an interactive command line session with a non-administrative ID, Tivoli Storage Manager prompts for an administrator ID. The NAS node name identifies the NAS file server to the Tivoli Storage Manager server. You must register the NAS node name at the server. Place the *nasnodename* option in your client system options file (dsm.sys). The value in the client system options file is the default, but this value can be overridden on the command line. See "Nasnodename" on page 254 for more information.

You can use the *pick* option to display a list of NAS images owned by the NAS node you specify. From this list you can select one or more images to restore. If you select multiple images to restore using the *pick* option, do not use the *monitor* option or you will serialize the restores. To start multiple restore processes simultaneously when restoring multiple images, do not specify *monitor*=*yes.*

Use the *monitor* option to specify whether you want to monitor a NAS file system image restore and display processing information on your screen. See "Monitor" on page 253.

Use the **monitor process** command to display a list of current restore processes for all NAS nodes for which your administrative user ID has authority. The authorized administrative user ID should have at least client owner authority over both the NAS node and the client workstation node they are using either from command line or from the web.

Use the **cancel process** command to stop NAS restore processing. For more information, see "Cancel Process" on page 364.

Regardless of client platform, NAS file system specifications use the forward slash (/) separator, as in this example: /vol/vol0.

Supported Clients

This command is valid for AIX and Solaris clients only.

Syntax

```
►►──REStore NAS──┬──────────┬── sourcefilespec ──┬──────────────────────┬──►◄
                 └─ options ─┘                    └─ destinationfilespec ─┘
```

Parameters

options

Table 90. Restore NAS command: Related options

Option	Where to use	Page
dateformat	Client user option file (dsm.opt) or command line.	184
inactive	Command line only.	229
mode	Command line only.	251
monitor	Command line only.	253
nasnodename	Client system options file (dsm.sys) or command line.	254
numberformat	Client user option file (dsm.opt) or command line.	260
pick	Command line only.	267
pitdate	Command line only.	268
pittime	Command line only.	269
timeformat	Client user option file (dsm.opt) or command line.	319

sourcefilespec
   Specifies the name of the NAS file system image you want to restore. This
   parameter is required unless you use the *pick* option to display a list of NAS
   images from which to choose. You cannot use wildcard characters when
   specifying the *sourcefilespec.*

destinationfilespec
   Specifies the name of an existing mounted file system on the NAS device over
   which you want to restore the image. This parameter is optional. The default is
   the original location of the file system on the NAS device.

Examples

Task   Restore the NAS file system image /vol/vol1 to the /vol/vol2 file system
   on the NAS file server called **nas1**.

   Command: `restore nas -nasnodename=nas1 /vol/vol1 /vol/vol2`

Task   Restore inactive NAS images.

   Command: `restore nas -nasnodename=nas2 -pick -inactive`

Restore WAS

Root User

The **restore was** command specifies whether to restore the WebSphere Application Server (WAS) Network Deployment Manager (contains setup, application files, and configuration information) or the Application Server from the Tivoli Storage Manager server. The Application Server must be stopped for the restore to proceed.

You can also restore the Network Deployment Manager, the Application Server, and their instances simultaneously in separate sessions.

Use the *wastype* option to specify whether to restore the Network Deployment Manager (ND) or Application Server (APP) associated with the node name of the instance of WAS that you want to restore. The default is ND. See "Wastype" on page 340 for more information.

WAS instance restore procedures

You can use the following procedure if your entire WebSphere installation is corrupted and it must be reinstalled, or you are installing WAS on a new machine:

1. Install WAS on a machine with the same name and IP address as the machine on which the back up was performed. If you backed up a Network Deployment Manager on machine *ebarton*, the restore must also be performed on machine *ebarton*. Install the same type of WAS as the back up (either ND or APP). When installing, choose the same node and cell names as the backup. For example, if you backed up an ND with a cell name of EdCell and node name of EdNode then the new server must also use these names. Install to the same location in which the backup was performed. For example, if the backup was performed on an APP server installed at /home/WebSphere/App, the new server must also be installed at /home/WebSphere/App. After installation ensure that that the server is stopped.

   Notes:
   1. You can use the *washome* option in your client user options file (dsm.opt) to specify an override base install path for the Application Server. See "Washome" on page 337 for more information.
   2. You can use the *wasndhome* option in your client user options file (dsm.opt) to specify an override base install path for the Network Deployment manager. See "Wasndhome" on page 338 for more information.

2. Restore the WAS node.
3. Start the server.
4. If the server is an ND, you can now attach any remote nodes. The ND and remote nodes will then synchronize.

Use the following procedure to restore to the same existing instance of a server. This procedure assumes that there is a preexisting WAS installation that is running and has a backup stored on the Tivoli Storage Manager server:

1. Stop the WAS server to be restored.
2. Restore the correct WAS node (same wastype and node name as the server that was stopped) to the same location.
3. Start the server.

On an ND, the server will synchronize the restored data with the remote nodes since they are already connected.

Notes:

1. For proper operation, the was node must be restored to same location and under same name.

2. WARNING! Restoring data other than at the group level can corrupt your WAS installation. It is strongly recommended that you restore data at the Network Deployment Manager node or Application Server node level only. See *IBM Tivoli Storage Manager for Application Servers 5.2: Data Protection for WebSphere Application Server Installation and User's Guide*, SC32-9075, for more information.

Supported Clients

This command is valid for AIX, Solaris, and Linux86 clients.

Syntax

```
►►──REStore WAS──────────────── ──nodename──────────────────────────►◄
                 └─ options ─┘
```

Parameters

options

Table 91. Restore WAS command: Related options

Option	Where to use	Page
fromdate	Command line only.	217
fromnode	Command line only.	218
fromowner	Command line only.	219
fromtime	Command line only.	220
ifnewer	Command line only.	225
inactive	Command line only.	229
latest	Command line only.	242
pick	Command line only.	267
pitdate	Command line only.	268
pittime	Command line only.	269
preservepath	Command line only.	276
replace	Client user options file (dsm.opt) or command line.	282
showmembers	Command line only.	302
tapeprompt	Client user options file (dsm.opt) or command line.	309
todate	Command line only.	323
totime	Command line only.	324
wastype	Command line only.	340

nodename
Specifies the node name of the instance of WAS that you want to restore.

Examples

Task Restore the Network Deployment Manager associated with the node name

wasnode. Use the ***pick*** option to restore a specific group backup. Use the ***showmembers*** option to display a list of group members from which you can select one or more to restore.

Command: `restore was wasnode -showmembers -pick`

Task Restore the Network Deployment Manager wasnode to the original location.

Command: `restore was wasnode -wastype=nd`

Retrieve

The **retrieve** command obtains copies of archived files from the Tivoli Storage Manager server. You can retrieve specific files or entire directories.

Use the *description* option to specify the descriptions assigned to the files you want to retrieve.

Use the *pick* option to display a list of your archives from which you can select an archive to retrieve.

Retrieve the files to the same directory from which they were archived, or to a different directory. Tivoli Storage Manager uses the *preservepath* option with the *subtree* value as the default for restoring files. For more information, see "Client options reference" on page 168.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──RETrieve──┬──────────┬──┬───────────────────┬──┬─────────────────────┬──►◄
              └─options──┘  │──sourcefilespec───│  └─destinationfilespec─┘
                            └─"sourcefilespec"──┘
```

Parameters

options

Table 92. Retrieve command: Related options

Option	Where to use	Page
dateformat	Client user options file (dsm.opt) or command line.	184
description	Command line only.	189
dirsonly	Command line only.	193
filelist	Command line only.	212
filesonly	Command line only	215
followsymbolic	Client user options file (dsm.opt) or command line.	216
fromdate	Command line only	217
fromnode	Command line only.	218
fromowner	Command line only	219
fromtime	Command line only	220
ifnewer	Command line only	225
pick	Command line only.	267
preservepath	Command line only.	276
replace	Client user options file (dsm.opt) or command line.	282
subdir	Client user options file (dsm.opt) or command line.	307
tapeprompt	Client user options file (dsm.opt) or command line	309
timeformat	Client user options file (dsm.opt) or command line.	319
todate	Command line only.	323

Table 92. Retrieve command: Related options (continued)

totime	Command line only.	324

sourcefilespec
> Specifies the path and file name that you want to retrieve. Use wildcard characters to specify a group of files or all the files in a directory. See "Maximum file size for operations" on page 74 for the maximum file size for retrieve processing.

destinationfilespec
> Specifies the path and file name where you want to retrieve the files to. If you do not specify a destination, Tivoli Storage Manager restores the files to the original source path.

> **Note:** If you do not specify a destination, Tivoli Storage Manager determines whether the original file system can be reached. If the original file system cannot be reached, Tivoli Storage Manager will not restore the file. This failure can also occur if you remove the *virtualmountpoint* option from the dsm.sys file. In this case, you can specify a different destination or restore the original *virtualmountpoint* option to the dsm.sys file, restart the client, and retry the command.

Examples

Task   Retrieve a single file named budget.

> **Command:** `retrieve /home/devel/projecta/budget`

Task   Retrieve all files with an extension of .c from the /home/devel/projecta directory.

> **Command:** `retrieve "/home/devel/projecta/*.c"`

Task   Retrieve all files in the /home directory.

> **Command:** `retrieve /home/`

Task   Retrieve all files with a file extension of .c from the /home/devel/projecta directory to the /home/newdevel/projectn/projecta directory. If the /projectn or the /projectn/projecta directory does not exist, it is created.

> **Command:** `retrieve "/home/devel/projecta/*.c" /home/newdevel/projectn/`

Task   Retrieve files in the /user/project directory. Use the *pick* option.

> **Command:** `ret "/user/project/*" -pick`

Task   Retrieve all files archived from the /proj directory with the description ″2002 survey results.″

> **Command:** `retrieve "/proj/*" -desc="2002 survey results"`

Task   Retrieve archived file /home/devel/budget with description ″my budget″ to the /dev/rmt1 tape drive.

> **Command:**
> ```
> mkfifo fifo
> dd if=fifo of=/dev/rmt1&
> dsmc retrieve -replace=yes -description="mybudget"
> /home/devel/budget fifo
> ```

Schedule

Authorized User

The **schedule** command starts the client scheduler on your workstation. The client scheduler must be running before scheduled work can start.

Notes:

1. The **schedule** command cannot be used if the *managedservices* option is set to *schedule*.
2. This command is valid only on the initial command line. It is not valid in interactive mode.

If the *schedmode* option is set to polling, the client scheduler contacts the server for scheduled events at the hourly interval you specified with the *queryschedperiod* option in your client user options file (dsm.opt). If your administrator sets the *queryschedperiod* option for all nodes, that setting overrides the client setting.

If you are using TCP/IP communications, the server can prompt your workstation when it is time to run a scheduled event. To do so, set the *schedmode* option to *prompted* in the client user options file (dsm.opt) or on the **schedule** command.

You can use the *sessioninitiation* option with the **schedule** command to control whether the server or client initiates sessions through a firewall. See "Sessioninitiation" on page 299 for more information. See "Configuring Tivoli Storage Manager client/server communication across a firewall" on page 45 for more information about Tivoli Storage Manager firewall support.

After you start the client scheduler, it continues to run and to start scheduled events until you press Ctrl+C, stop the scheduler process with the UNIX **kill** command, start the workstation again, or turn off the workstation to end it.

Note: You *cannot* enter this command in interactive mode.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──SCHedule─────────────────────────────────────────────►◄
              └─ options ─┘
```

Parameters

options

Table 93. Schedule command: Related options

Option	Where to use	Page
maxcmdretries	Client system options file (dsm.sys) or command line.	249
password	Client user options file (dsm.opt) or command line.	263
queryschedperiod	Client system options file (dsm.sys) or command line.	279
retryperiod	Client system options file (dsm.sys) or command line.	287
schedlogname	Client system options file (dsm.sys) or command line.	290

Table 93. Schedule command: Related options (continued)

schedmode	Client system options file (dsm.sys) or command line.	292
sessioninitiation	Client system options file (dsm.sys) or command line.	299
tcpclientport	Client system options file (dsm.sys) or command line.	314

Examples

Task   For AIX: Start the scheduler at system bootup time by entering this command in the /etc/inittab file. Ensure the ***passwordaccess*** option is set to *generate*.

Command: `tsm::once:/usr/lpp/adsm/bin/dsmc sched > /dev/null 2>&1 #TSM Scheduler`

Task   Interactively start the scheduler and keep it running in the background.

Command: `nohup dsmc sched 2> /dev/null &`

When you run the **schedule** command, all messages regarding scheduled work are sent to the dsmsched.log file or to the file you specify with the ***schedlogname*** option in your client system options file (dsm.sys). If you do not specify a directory path with the file name in the ***schedlogname*** option, the dsmsched.log file will reside in the default installation directory.

Selective

The **selective** command backs up files that you specify. If these files become damaged or lost, you can replace them with backup versions from the server. When you run a selective backup, all the files are candidates for back up unless you exclude them from backup, or they do not meet management class requirements for serialization. See "File system and ACL support" on page 72 for supported file systems and ACL support.

During a selective backup, copies of the files are sent to the server even if they did not change since the last backup. This might result in more than one copy of the same file on the server. If this occurs, you might not have as many different down-level versions of the file on the server as you intended. Your version limit might consist of identical files. To avoid this, use the **incremental** command to back up only new and changed files.

You can selectively back up single files *or* directories. You can also use wildcard characters to back up groups of related files.

If you set the *subdir* option to *yes* when backing up a specific path and file, Tivoli Storage Manager recursively backs up *all* subdirectories under that path, and any instances of the specified file that exist under *any* of those subdirectories.

During a selective backup, a directory path may be backed up, even if the specific file that was targeted for backup is not found. For example:

```
selective "/dir1/dir2/bogus.txt"
```

still backs up dir1 and dir2 even if the file bogus.txt does not exist.

If the **selective** command is retried because of a communication failure or session loss, the transfer statistics will display the number of bytes Tivoli Storage Manager attempts to transfer during *all* command attempts. Therefore, the statistics for bytes transferred may not match the file statistics, such as those for file size.

Removing operand limits
You can use the *removeoperandlimit* option to specify that Tivoli Storage Manager removes the 20-operand limit for UNIX-family platforms. If you specify the *removeoperandlimit* option with the **selective** command, the 20-operand limit is not enforced and is restricted only by available resources or other operating system limits. See "Removeoperandlimit" on page 281

Associating a local snapshot with a server file space
Use the *snapshotroot* option with the **selective** command in conjunction with a third-party application that provides a snapshot of a logical volume, to associate the data on the local snapshot with the real file space data that is stored on the Tivoli Storage Manager server. The *snapshotroot* option does not provide any facilities to take a volume snapshot, only to manage data created by a volume snapshot. See "Snapshotroot" on page 304 for more information.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
        ▶▶──Selective──────┬─────────┬──┬──filespec──────┬──────────────────────────────▶◀
                           └─options─┘  └──"filespec"──┘
```

Parameters

options

Table 94. Selective command: Related options

Option	Where to use	Page
changingretries	Client system options file (dsm.sys) or command line.	172
compressalways	Client user options file (dsm.opt) or command line.	180
compression	Client system options file (dsm.sys) *within* a server stanza or command line.	181
dirsonly	Command line only.	193
filelist	Command line only.	212
filesonly	Command line only.	215
preservelastaccessdate	Client user options file (dsm.opt) or command line.	274
removeoperandlimit	Command line only.	281
snapshotroot	Command line only.	304
subdir	Client user options file (dsm.opt) or command line.	307
tapeprompt	Client user options file (dsm.opt) or command line.	309

filespec
> Specifies the path and file name that you want to back up. Use wildcard characters to select a group of files or all the files in a directory. When backing up a file system, specify the file system with a trailing slash; for example: /home/.

Examples

Task   Back up the proja file in the /home/devel directory.

> **Command:** `selective /home/devel/proja`

Task   Back up all files in the /home/devel directory whose file names begin with proj.

> **Command:** `selective "/home/devel/proj*"`

Task   Back up all files in the /home/devel directory whose file names begin with proj. Back up the single file named budget in the /user/home directory.

> **Command:** `selective "/home/devel/proj*" /user/home/budget`

Task   Back up the /home file system.

> **Command:** `selective /home/ -subdir=yes`

Task   Assuming that you initiated a snapshot of the /usr file system and mounted the snapshot as /snapshot/day1, run a selective backup of the /usr/dir1/sub1 directory tree from the the local snapshot and manage it on the Tivoli Storage Manager server under the file space name /usr.

Command: `dsmc sel "/usr/dir1/sub1/*" -subdir=yes`
`-snapshotroot=/snapshot/day1`

Set Access

The **set access** command gives users at other nodes access to your backup versions, archived copies, or backup images. You can give another user access to a specific file or image, multiple files or images, or all files in a directory. When you give access to another user, that user can restore or retrieve your objects. Specify in the command whether you are giving access to archives or backups.

Note: You cannot give access to both archives and backups using a single command.

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──SET Access──┬─ Archive ─┬──┬─ filespec ─┬── node ──┬──────────┬──►◄
                └─ Backup ──┘  └─ image-fs ─┘           └── user ──┘
```
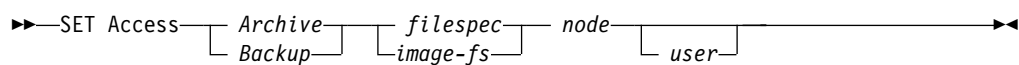
Parameters

Archive
    Permits access to archived files or images.

Backup
    Permits access to backup versions of files or images.

filespec
    Specifies the path, file, image, or directory to which your are giving access to another node or user. Use wildcard characters to specify a group of files or images, or all files in a directory; all objects in a directory branch; or all objects in a file system. Use a single asterisk ″*″ for the file spec to give access to all files or images owned by you and backed up on the server. When the command **set access backup** ″*″ **node** is entered, no check is made with the server; it is assumed you have at least one object backed up.

    If you give access to a branch of the current working directory, you only need to specify the branch. If you give access to objects that are not in a branch of the current working directory, you must specify the complete path. The file spec to which you gave access must have at least one backup version or archive copy object (file or directory) on the server.

    To specify all files in a named directory, enter /home/mine/proj1/* on the command line.

    To give access to all objects *below* a certain level, use an asterisk, directory delimiter, and an asterisk at the end of your file spec. For example, to give access to all objects below home/test, use file spec home/test/*/*.

    Attention: Use of the form /*/* alone will not give access to objects in the named directory; only those in directories below the named directory will be accessible.

    The rules are essentially the same when considering the root directory. Enter /* on one set access command and /*/* on another if you want another user to have access to all files and directories *in* and *below* the root directory. The first

/* gives access to all directories and all files in the root directory. The second
/* allows access to all directories and files below the root directory.

For example:
- Your directory structure is multilevel: /home/sub1/subsub1.
- The /home directory contains the h1.txt and h2.txt files.
- The /home/sub1 directory contains file s1.htm.
- The /home/sub1/sub2 directory contains the ss1.cpp file.

To allow access to all files in the /home/sub1/sub2 directory, enter:
```
set access backup /home/sub1/sub2/* * *
```

To allow access to only those files in the /home directory, enter:
```
set access backup /home/* * *
```

To allow access to all files in all directories *in* and *below* the /home directory, enter:
```
set access backup /home/* * *
set access backup /home/*/* * *
```

image-fs
  The name of the image file system to be shared. This may be specified as an asterisk (*) to allow access to all images owned by the user granting access.

node
  Specifies the client node of the user to whom you are giving access. Use wildcards to give access to more than one node with similar node names. Use an asterisk (*) to give access to all nodes.

user
  This is an optional parameter that restricts access to the named user at the specified node.

Examples

Task Give the user at node_2 authority to restore the budget file from the /home/user directory.

  Command: `set access backup /home/user/budget node_2`

Task Give node_3 authority to retrieve all files in the /home/devel/proja directory whose file names end with .c.

  Command: `set access archive "/home/devel/proja/*.c" node_3`

Task Give node_3 the authority to retrieve all files in the /home/devel/proja directory.

  Command: `set ac archive /home/devel/proja/ node_3`

Task Give all nodes whose names end with bldgb the authority to restore all backup versions from directories with a file space name of project.

  Command: `set ac b "{project}/*" "*bldgb"`

Task Give user serena at node_5 authority to restore all images of the file space mounted on directory /home/devel/proja.

  Command: `set acc backup "home/devel/proja/*/*" node_5 serena`

Set Password

Authorized User

The **set password** command changes the Tivoli Storage Manager password for your workstation. If you omit the old and new passwords when you enter the **set password** command, you are prompted once for the old password and twice for the new password.

A password is *not* case-sensitive, and it can be as many as 63 characters. Valid characters are:
a–z	Any letter, a through z, upper or lower-case
0–9	Any number, 0 through 9
+	Plus
.	Period
_	Underscore
-	Hyphen
&	Ampersand

Supported Clients

This command is valid for all UNIX clients.

Syntax

```
►►──SET Password──────────────────────────────────────────────►◄
                  └── oldpw newpw──┘
```

Parameters

oldpw
Specifies the current password for your workstation.

newpw
Specifies the new password for your workstation.

Examples

The following is an example of using the **set password** command.

Task Change your password from osecret to nsecret.

Command: set password osecret nsecret

Set Waspassword

Root User

If WAS security is enabled, user name and password validation for Data Protection for WebSphere Application Server is required. If you do not set the WAS password for the security, the backup will failover to an offline backup. It is recommended to set the was security password to perform consistent backups. Use the **set waspassword** command to set the user name and password for each installation of WAS on your machine. You only need to perform this task once, unless you change your WAS user name or password. You can only perform this task on the Tivoli Storage Manager command line.

To determine if WAS security is enabled, enter the following command:

```
dsmc query was -wast=local
```

Tivoli Storage Manager displays the WAS security status under the **Sec** heading.

Supported Clients

This command is valid for AIX, Solaris, and Linux86 clients.

Syntax

```
►►──SET WASPassword──────────────────────────────────────────────►◄
                      └─ WASNode─ WASType─ WASUser─┘
```

Parameters

WASNode
> Specifies the node name on which each installation of WAS is installed. This parameter is required. If you do not specify a value for this parameter, Tivoli Storage Manager prompts you. See "Wasnode" on page 339 for more information.

WASType
> Specifies the WAS Network Deployment Manager (ND) or Application Server (APP). This parameter is required. If you do not specify a value for this parameter, ND is the default value. See "Wastype" on page 340 for more information.

WASUser
> Specifies WAS user name. This parameter is required. If you do not specify a value for this parameter, Tivoli Storage Manager prompts you. See "Wasuser" on page 341 for more information.

Examples

Task: Set the WebSphere user name and password for each installation of WAS on your machine.

> **Command:** `dsmc set waspassword -wasnode=wasnode -wastype=app -wasuser=ed`

> Tivoli Storage Manager prompts for the WebSphere password, as follows:

```
Please enter the WebSphere password:
```

If you do not specify the *wasnode* or *wasuser* options, Tivoli Storage Manager prompts for this information as follows:

```
Please enter WebSphere node name:

Please enter the WebSphere user name:
```

Appendix A. Using the Tivoli Storage Manager central scheduler

Overview of the TSM scheduler

The Tivoli Storage Manager central scheduler allows client operations to occur automatically at specified times. In order to understand scheduling with Tivoli Storage Manager, several terms need to be defined:

schedule definition
> A definition on the Tivoli Storage Manager server which specifies critical properties of the automated activity including the type of action, the time the action should take place, and how frequently the action will take place. There are numerous other properties which can be set (see the appropriate *Tivoli Storage Manager Administrator's Reference Guide* for a detailed description of the **define schedule**.)

schedule association
> An assignment to a specific schedule definition for a client node. Multiple schedule associations allow single schedule definitions to be used by many client nodes. Because schedule definitions are included with specific policy domains, it is only possible for nodes defined to a certain policy domain to be associated with schedules defined in that domain.

scheduled event
> A specific occurrence of when a schedule will be executed for a node. The following conditions must be met before automatic scheduled events will take place for a client:
> * A schedule definition must exist for a specific policy domain.
> * A schedule association must exist for the required node which belongs to that policy domain.
> * The client scheduler process must be running on the client system (see "Setting the client scheduler process to run as a background task and start automatically at boot time" on page 439 for more information).

When creating a schedule definition on the Tivoli Storage Manager server, schedule actions that you can take include incremental, selective, archive, restore, retrieve, imagebackup, imagerestore, command, and macro. The scheduled action that is most frequently used is incremental with the *objects* parameter left undefined. With this setting, the Tivoli Storage Manager client performs a domain incremental backup of all drives defined by the client domain option. A schedule definition using the *command* action allows an operating system command or shell script to be executed. When automating tasks for *Tivoli Storage Manager for Data Protection* clients, you must use *command* action schedule definitions which invoke the command line utilities for the ″Tivoli Storage Manager for″ application.

The schedule *startup window* indicates the acceptable time period for a scheduled event to start. The startup window is defined by these schedule definition parameters: *startdate*, *starttime*, *durunits*, and *duration*. The *startdate* and *starttime* options define the beginning of the startup window for the very first scheduled event. The beginning of the startup windows for subsequent scheduled events will vary depending on the *period* and *perunit* values of the schedule definition. The *duration* of the schedule window defines the length of the startup window. The

schedule action is required to start within the startup window. To illustrate, consider the results of the following schedule definition:

```
define schedule standard test1 action=incremental starttime=12:00:00 period=1
perunits=hour dur=30 duru=minutes
```

Event	Window start	Window end	Actual start (just an example, times will vary)
1	12:00:00	12:30:00	12:05:33
2	13:00:00	13:30:00	13:15:02
3	14:00:00	14:30:00	14:02:00
and so on			

The variation in actual start times is a result of the randomization feature provided by the Tivoli Storage Manager central scheduler which helps to balance the load of scheduled sessions on the Tivoli Storage Manager server.

Handling spaces in file names in schedule definitions

When defining or updating a schedule *objects* parameter with file specifications that contain blank spaces, use double quotes around each file specification that contains blanks, then single quotes around all of the specifications. Examples:

```
objects='"/home/proj1/Some file.doc"'
objects='"/home/proj1/Some file.doc" "/home/Another file.txt"
/home/noblanks.txt'
objects='"/home/My Directory With Blank Spaces/"'
```

This will ensure that /home/proj1/Some file.docis treated as a single file name, as opposed to three separate files (/home/proj1/Some, and file.doc).

You can also refer to the *objects* parameter information for the **define schedule** and **update schedule** commands in the appropriate *IBM Tivoli Storage Manager Administrator's Reference*

Preferential start times for certain nodes

Occasionally, you may want to ensure that a particular node begins its scheduled activity as close as possible to the schedule's defined start time. The need for this typically arises when prompted mode scheduling is in use. Depending on the number of client nodes associated with the schedule and where the node is in the prompting sequence, the node might be prompted significantly later than the start time for the schedule. In this case, you can perform the following steps:

1. Copy the schedule to a new schedule with a different name (or define a new schedule with the preferred attributes).
2. Set the new schedule priority attribute so that it has a higher priority than the original schedule.
3. Delete the association for the node from the original schedule, then associate the node to the new schedule.

Now the Tivoli Storage Manager server will process the new schedule first.

Understanding scheduler processing options

There are several processing options which impact the behavior of the client scheduler. On the Tivoli Storage Manager client, you can define most of these options in the client user options file (dsm.opt) or client system options file (dsm.sys). However, some of these options can be set globally on the Tivoli Storage Manager server for all Tivoli Storage Manager clients. The **Managing Throughput of Scheduled Operations** section of the *Tivoli Storage Manager Administrator's Guide* provides detailed information on all topics described in the section.

Option	Client defined	Server defined	Server global override
managedservices	X		
maxcmdretries	X		**set maxcmdretries** command
maxschedsessions		X	
postschedulecmd, postnschedulecmd	X		
preschedulecmd, prenschedulecmd	X		
queryschedperiod	X		**set queryschedperiod** command
randomize		X	
retryperiod	X		**set retryperiod** command
schedcmddisabled	X		
schedlogname	X		
schedlogretention	X		
schedmode	X		**set schedmodes** command
sessioninitiation	X	X (**update node** command)	
tcpclientaddress	X	X (also defined on server when *sessioninit=serveronly* as part of the node definition)	
tcpclientport	X	X (also defined on server when *sessioninit=serveronly* as part of the node definition)	

Client defined options are defined in the dsm.sys or dsm.opt file depending on the option and platform. The Tivoli Storage Manager server can also define some options in a client options set, or as part of the options parameter of the schedule definition. The Tivoli Storage Manager server can also set some options globally for all clients. By default, the client setting for these options is honored. If the global override on the Tivoli Storage Manager server is set, the client setting for the option is ignored. Defining client options as part of the schedule definition is

useful if you want to use specific options for a scheduled action that differ from the option settings normally used by the client node, or are different for each schedule the node will execute.

The *schedmode* option controls the communication interaction between the Tivoli Storage Manager client and server. There are three variations on the schedule mode: *client polling*, *server prompted*, *server prompted* with sessions only originated by the Tivoli Storage Manager server (*sessioninit=serveronly.*)

Handling return codes from preschedulecmd and postschedulecmd Scripts

Beginning with Tivoli Storage Manager version 5.1, the scheduler exhibits the following behavior when the *preschedulecmd* and *postschedulecmd* options are used:

- If the command specified by the *preschedulecmd* option ends with a nonzero return code, Tivoli Storage Manager considers the command to have failed. In this case, neither the scheduled event nor any *postschedulecmd* or *postnschedulecmd* command will run. The administrative **query event** command with *format=detailed* option will show that the event failed with return code 12.
- If the command specified by the *postschedulecmd* option ends with a nonzero return code, Tivoli Storage Manager considers the command to have failed. The administrative **query event** command with *format=detailed* option will show that the event completed with return code 8, unless the scheduled operation completed with a higher return code, in which case the higher return code prevails. Therefore, if the scheduled operation completes with return code 0 or 4 and the *postschedulecmd* command fails, the administrative **query event** command will show that the event completed with return code 8. If the scheduled operation completes with return code 12, that return code prevails, and **query event** will show that the event failed with return code 12.

When interpreting the return code from a command, Tivoli Storage Manager considers 0 to mean success, and anything else to mean failure. While this behavior is widely accepted in the industry, it is not 100% guaranteed. For example, the developer of the widget.exe command might exit with return code 3, if widget.exe ran successfully. Therefore, it is possible that the *preschedulecmd* or *postschedulecmd* command may end with a nonzero return code and be successful. To prevent Tivoli Storage Manager from treating such commands as failed, you should wrap these commands in a script, and code the script so that it interprets the command return codes correctly. The script should exit with return code 0 if the command was successful; otherwise it should exit with a nonzero return code. The logic for a script running widget.exe might look like this:

```
run 'widget.exe'
   if lastcc == 3
      exit 0
   else
      exit 1
```

See the following references for more information:
- "Postschedulecmd/Postnschedulecmd" on page 270
- "Preschedulecmd/Prenschedulecmd" on page 272
- "Return codes from the command line interface" on page 131

Using the client acceptor to manage scheduler services versus the legacy scheduler services

You can configure the Tivoli Storage Manager client to manage the scheduler process via the Tivoli Storage Manager Client Acceptor (CAD). The CAD provides a light-weight timer which automatically starts and stops the scheduler process as needed. Alternatively, the traditional method keeps the Tivoli Storage Manager scheduler process running continuously. Generally, using the CAD to manage the scheduler is the preferred method. These methods are compared as follows:

CAD-managed Services
- Defined using the *managedservices* option and started with CAD services (dsmcad).
- The CAD starts and stops the scheduler process as needed for each scheduled action.
- Requires fewer system resources when idle.
- Tivoli Storage Manager client options and Tivoli Storage Manager server override options are refreshed each time the CAD services start a scheduled backup.

Tivoli Storage Manager legacy scheduler services
- Started with command `dsmc sched` command.
- Remains active, even after scheduled backup is complete.
- Requires higher use of system resources when idle.
- Tivoli Storage Manager client options and Tivoli Storage Manager server override options are only processed once when `dsmc sched` is started.
- You must restart the scheduler process for updated Tivoli Storage Manager options to take effect.

Setting the client scheduler process to run as a background task and start automatically at boot time

You can configure the Tivoli Storage Manager client scheduler to run as a background system task which starts automatically when your system is booted. This is true for both CAD-managed and traditional methods of running the Tivoli Storage Manager client scheduler. When running a CAD-managed schedule, only the CAD process should be set to start automatically at boot time; not the scheduler process. For the traditional method, the scheduler process should be set up to start automatically at boot time.

You can configure the CAD to run as a background system task which starts automatically when your system is booted. To configure the CAD to manage scheduled backups, you must set the *managedservices* option to manage the scheduler, or both the scheduler and web client. The method for setting up the CAD as a system task varies for each platform.

In order for the scheduler to start unattended, you must enable the client to store its password by setting the *passwordaccess* option to *generate*, and store the password by running a simple Tivoli Storage Manager client command such as `dsmc query session`. Note that for testing purposes, you can always start the scheduler in the foreground by running `dsmc sched` from a command prompt.

To start the scheduler automatically at boot time, use either of the following methods:

CAD-managed

1. In your client system options file (dsm.sys), set the ***managedservices*** option to *schedule* or *schedule webclient*.

2. Add the following entry into the system startup file (/etc/inittab for most platforms):

   ```
   tsmcad::once:/usr/bin/dsmcad > /dev/null 2>&1 # TSM Client Acceptor
   Daemon
   ```

3. In your client system options file (dsm.sys), set the ***passwordaccess*** option to *generate*.

4. Run a command like `dsmc query sess` to store the node password.

Traditional

1. In your client system options file (dsm.sys), either set the ***managedservices*** option to *webclient* or do not define this option.

2. Add the following entry into the system startup file (/etc/inittab for most platforms):

   ```
   tsmsched::once:/usr/bin/dsmc sched > /dev/null 2>&1 # TSM scheduler
   ```

   For OS/390 UNIX:

   a. Create a shell script called /tivoli/tsm/client/ba/bin/rundsmc which contains the following entries:

      ```
      cd /usr/lpp/Tivoli/tsm/client/ba/bin
      sleep 60
      ./dsmc schedule
      ```

      This prevents the creation of two jobs with the same name and enables automatic shutdown. You might need to customize the time for your system.

   b. Add the following entries in the /etc/rc file to set environment variables to retrieve the ***servername*** and ***nodename*** options from dsm.sys and to start the client scheduler, as follows:

      ```
      # Set environment variables to retrieve the servername and
      # nodename options from dsm.sys.
      export DSM_DIR=/tivoli/tsm/client/ba/bin
      export DSM_CONFIG=/tivoli/tsm/client/ba/bin/dsm.opt
      # Start the TSM Client scheduler and redirect outputs to
      # schedule.out instead of the /etc/log file.
      _BPX_JOBNAME='ADSMCLNT' /tivoli/tsm/client/ba/bin/rundsmc
      1>/tivoli/tsm/client/ba/bin/schedule.out 2>&1 &
      ```

      Note: Enter the _BPX_JOBNAME entry on a single line in the /etc/rc file.

3. In your client system options file (dsm.sys), set the ***passwordaccess*** option to *generate*.

4. Run a command like `dsmc query sess` to store the node password.

5. To start the client scheduler on your client node and connect to the server schedule, enter the following command:

   ```
   dsmc schedule
   ```

   If the current directory is not in your PATH environment variable, enter the following command:

   ```
   ./dsmc schedule
   ```

When you start the client scheduler, it runs continuously until you close the window, end the process, or log off your system.

To run the **schedule** command in the background and to keep the client scheduler running, even if you log off your system, enter the following:

```
nohup dsmc schedule 2> /dev/null &
```

Managing multiple schedule requirements on one machine

In certain situations it is preferable to have more than one scheduled activity for each client system. Normally, you can do this by associating a node with more than one schedule definition. This is the standard method of running multiple schedules on one machine. You must ensure that the schedule windows for each schedule do not overlap. A single client scheduler process is not capable of executing multiple scheduled actions simultaneously, so if there is overlap, the second schedule to start will be missed if the first schedule does not complete before the end of the startup window of the second schedule. Suppose that most of the drives on your client system must be backed up daily, and that one drive containing critical data must be backed up hourly. In this case, you would need to define two schedules to handle this requirement. To avoid conflict between the hourly and daily backup schedule, the *starttime* of each schedule needs to be varied.

In certain cases, it is necessary to run more than one scheduler process on a system. Multiple processes require a separate options file for each process and must contain the following information:

- Define a unique node name for each process
- Specify unique schedule and error logs for each process
- When running in prompted mode, you must use the ***tcpclientport*** option to specify a unique port for each process.

The advantages of using multiple schedule processes:

- You can run more than one scheduled back at the same time.
- You can specify different backup criteria for each schedule started, via Tivoli Storage Manager client option file or Tivoli Storage Manager server override options.

The disadvantages of using multiple schedule processes:

- A unique file space for each node name on the Tivoli Storage Manager server is created.
- When restoring the data, you must use the same node name associated with the backup.

Multiple schedule processes can run on UNIX platforms with either the CAD managed method, or the traditional method of running the scheduler. In either case, there are certain setup requirements:

- Each process must run using a different node name.
- You must create multiple stanzas in the client system options file (dsm.sys) for each scheduler process. In each stanza, you must define a unique node name, along with unique values for the options ***errorlogname*** and ***schedlogname***. You may also choose to define customized ***domain***, ***include***, and ***exclude*** statements for each stanza.

- In you client system options file (dsm.sys), set the *passwordaccess* option to generate in each stanza. The password must be generated for each node name that will be running a scheduler process, by running a command such as `dsmc query sess`.
- If running with the *schedmode* option set to *prompt*, you should set a unique *tcpclientport* value for each stanza.

You must start each `dsmc sched` command or instance with the -servername option to reference its unique stanza name in dsm.sys. For dsmcad, it is necessary to define the environment variable DSM_CONFIG for each instance of dsmcad to reference its unique option file.

The following is an example configuration of two schedule processes managed by the CAD in the client system options file (dsm.sys). Note that you must use full paths for the log file names to avoid the files being written in the root directory):

```
servername tsm1_sched1
  nodename       aixsvt01_sched1
  tcpserv        firebat
  tcpclientport  1507
  passwordaccess generate
  domain         /svt1
  schedmode      prompted
  schedlogname   /tsm/dsmsched1.log
  errorlogname   /tsm/dsmerror1.log
  managedservices schedule

servername tsm1_sched2
  nodename       aixsvt01_sched2
  tcpserv        firebat
  tcpclientport  1508
  passwordaccess generate
  domain         /svt1
  schedmode      prompted
  schedlogname   /tsm/dsmsched2.log
  errorlogname   /tsm/dsmerror2.log
  managedservices schedule
```

Contents of /test/dsm.opt1:

```
servername tsm1_sched1
```

Contents of /test/dsm.opt2:

```
servername tsm1_sched2
```

Open two shell command windows:
- In shell command window 1, enter:

```
export DSM_CONFIG=/test/dsm.opt1
dsmcad
```
- In shell command window 2, enter:

```
export DSM_CONFIG=/test/dsm.opt2
dsmcad
```

Note: You should enter these commands into a shell script if you intend to have the dsmcad processes started directly from /etc/inittab so that the proper DSM_CONFIG variable can be set prior to launching dsmcad.

Restarting the scheduler process on a remote machine

When managing a large number of Tivoli Storage Manager clients running scheduler processes, it is helpful to be able to start and stop the client service from a remote machine.

You can create a shell script to search for and kill running Tivoli Storage Manager scheduler or CAD processes, and restart the processes. You can use software products, such as Symark Power Broker, to allow Tivoli Storage Manager administrators limited access to UNIX servers to manage the scheduler processes and copy off the Tivoli Storage Manager schedule log file. The following shell script is an example of how to recycle the Tivoli Storage Manager scheduler process:

```ksh
#!/bin/ksh
# Use the following script to kill the currently running instance of the
# TSM scheduler, and restart the scheduler in nohup mode.
#
# This script will not work properly if more than one scheduler process is
# running.

# If necessary, the following variables can be customized to allow an
# alternateoptions file to be used.
# export DSM_DIR=
# export DSM_CONFIG=
# export PATH=$PATH:$DSM_DIR

# Extract the PID for the running TSM Scheduler
PID=$(ps -ef | grep "dsmc sched" | grep -v "grep" | awk {'print $2'});
print "Original TSM scheduler process using PID=$PID"

# Kill the scheduler
kill -9 $PID

# Restart the scheduler with nohup, redirecting all output to NULL
# Output will still be logged in the dsmsched.log
nohup dsmc sched 2>&1 > /dev/null &

# Extract the PID for the running TSM Scheduler
PID=$(ps -ef | grep "dsmc sched" | grep -v "grep" | awk {'print $2'});
print "New TSM scheduler process using PID=$PID"
```

Using the scheduler on clustered systems

Using Tivoli Storage Manager client in cluster environment requires additional configuration steps and can be easily done. There are some concepts to keep in mind when configuring Tivoli Storage Manager client in cluster environment:

- The Tivoli Storage Manager client is not a cluster aware application and processes data from shared volumes in the same way as from local volumes.
- By default, Tivoli Storage Manager file space naming convention is MACHINE_NAME\VOLUME_NAME. If the Tivoli Storage Manager client backs up the same shared volume from two different cluster nodes using same Tivoli Storage Manager node, two different file spaces are created on the Tivoli Storage Manager server containing the same data. To avoid this, you must set the *clusternode* option to *yes* in the Tivoli Storage Manager client options file (dsm.opt). This setting changes the file space naming convention to CLUSTER_NAME\VOLUME_NAME and allows the Tivoli Storage Manager client to successfully manage backups of shared volumes taken from different cluster nodes. At the same time, this change in file space naming will result in mixing data from physically different local volumes under one file space on the Tivoli Storage Manager server.

It is recommended that you separate the backup of shared and local volumes. If the cluster has several shared disk resources which can migrate from one cluster node to another, it is recommended to run a separate instance of the Tivoli Storage Manager client for each disk resource. This allows Tivoli Storage Manager client instances to migrate together with disk resources, in case of failover or failback. See cluster software documentation for information about how to create a program resource. In case of a failover or failback, the disk resources must be up and running before the Tivoli Storage Manager client starts.

The Tivoli Storage Manager client will prompt for the password if it is not readable from a password file. The Tivoli Storage Manager node password must be available for all Tivoli Storage Manager client cluster nodes where the Tivoli Storage Manager client resource can migrate to. For example, if a cluster has three nodes A, B and C and the Tivoli Storage Manager client resource can execute on nodes A and C, passwords must be readable on nodes A and C but not on B. See "Changing your password" on page 65 for more information about how to generate Tivoli Storage Manager client passwords.

For information on how to configure a Tivoli Storage Manager server to manage a cluster configured client, see Appendix B, "Configuring the backup-archive client in an HACMP takeover environment," on page 447.

Using the scheduler through a firewall

See "Configuring Tivoli Storage Manager client/server communication across a firewall" on page 45 for more information.

Troubleshooting the Tivoli Storage Manager scheduler

The Tivoli Storage Manager server maintains records of scheduled events which can be helpful when managing Tivoli Storage Manager schedules on several client machines. The Tivoli Storage Manager server **query event** command allows an administrator to view event records on the Tivoli Storage Manager server. A useful query which shows all of the event results for the previous day is:

```
query event * * begind=today-1 begint=00:00:00 endd=today-1 endt=23:59:59
```

You can limit query results to exception cases with:

```
query event * * begind=today-1 begint=00:00:00 endd=today-1 endt=23:59:59
exceptiononly=yes
```

Query results include a status field which gives a summary of the result for a specific event. By using the *format=detailed* option on the **query event** command, complete information for events displays, including the return code passed back by the Tivoli Storage Manager client. Table 95 on page 445 summarizes the meaning of the event status codes which are likely to exist for a scheduled event that has already taken place:

Table 95. Scheduled client event status codes

Status	Meaning
Completed	The scheduled client event ran to completion without a critical failure. There is a possibility that the event completed with some errors or warnings. Query the event with detailed format to inspect the event result for more information. The result can either be 0, 4, or 8.
Missed	The schedule start window elapsed without action from the Tivoli Storage Manager client. Common explanations are that the schedule service is not running on the client or a previous scheduled event is not completing for the same or a different schedule.
Started	Normally, this indicates that a scheduled event has begun. However, if an event showing a status of *Started* is followed by one more *Missed* events, it is possible that the client scheduler encountered a hang while processing that event. One common cause for a hanging client schedule is the occurrence of a user interaction prompt, such as a prompt for an encryption key, to which the user has not responded.
Failed	The client event ran to completion, however, a critical failure occurred.

Investigating abnormal scheduled events

If a particular client node displays multiple consecutive events with a result of *missed*, the client scheduler process is not running, has terminated, or is hanging. See "Restarting the scheduler process on a remote machine" on page 443 for tips on how to remotely recycle the hanging scheduler process. If a scheduled event is missed, but other consecutive scheduled events for that node show a result of *completed*, investigate the server activity log and the client schedule log to determine the cause. Scheduled events with a result of *failed*, have encountered a processing error originating either from the Tivoli Storage Manager client or server. The first place to check is the server activity log during the time period in which the scheduled event was processed. The activity log shows Tivoli Storage Manager server processing errors and some client errors which have been remotely logged to the Tivoli Storage Manager server. If the explanation cannot be found in the activity log, check the client schedule log.

Checking the server activity log

When checking the server activity log, narrow the query results down to the time period in which the scheduled event occurred. Begin the event log query at a time shortly before the start window of the scheduled event. For example, if you are investigating the following suspect event:

```
Scheduled Start      Actual Start          Schedule Name Node Name     Status
-------------------- --------------------  ------------- ------------- -------
08/21/2003 08:27:33                        HOURLY        NODEA         Missed
```

You could use one of the following queries:

```
query actlog begind=08/21/2003 begint=08:25:00
query actlog begind=08/21/2003 begint=08:25:00 originator=client node=nodea
```

Inspecting the Client Schedule Log

The Tivoli Storage Manager client maintains a detailed log of all scheduled activities. If queries of the server activity log do not explain a failed scheduled event, check the Tivoli Storage Manager client schedule log. Access to the client machine is required for inspecting the schedule log. The schedule log file typically resides in the same directory in which the Tivoli Storage Manager client software is installed, in a file named dsmsched.log. The location of the log file can be specified using the *schedlogname* option, so you may need to refer to the options file to see if the *schedlogname* option was used to relocate the log file. When you locate the schedule log, it is easy to search through the file to find the time period corresponding the start date and time of the scheduled event. Here are some tips on what to look for:

- If you are investigating a *missed* event, check the details of the previous event, including the time at which the previous event completed.
- If you are investigating a *failed* event, look for error messages which explain the failure, such as an exceeded Tivoli Storage Manager server session limit.
- If an explanation is remains unclear, check client error log file (usually named dsmerror.log.)

Appendix B. Configuring the backup-archive client in an HACMP takeover environment

High Availability Cluster Multi Processing (HACMP) allows scheduled Tivoli Storage Manager client operations to continue processing during a failover situation.

For example, a scheduled incremental backup of a clustered volume is running on **machine**-**a**. A situation causes the client acceptor daemon (CAD) to failover to **machine**-**b**. **machine**-**b** then reconnects to the server. If the reconnection occurs within the start window for that event, the scheduled command is restarted. This scheduled incremental backup will reexamine files sent to the server before the failover. The backup will then ″catch up″ to where it terminated before the failover situation.

If a failover occurs during a user initiated client session, the Tivoli Storage Manager CAD starts on the node that is handling the takeover. This allows it to process scheduled events and provide Web client access. You can install Tivoli Storage Manager locally on each node of an HACMP environment. You can also install and configure the Tivoli Storage Manager Scheduler Service for each cluster node to manage all local disks and each cluster group containing physical disk resources.

Note: If you use the *httport* option to specify specific ports for Web client access, this will help you remember which port to point to. Without it, the CAD will find first available port, starting with 1581, and will likely change ports when failover or fallback occurs. Choosing a port value, such as 1585 can save you the inconvenience of trying to determine which port the CAD may have changed to.

The *clusternode* option determines if you want the Tivoli Storage Manager client to back up cluster resources and participate in cluster failover for high availability. See "Clusternode" on page 174 for more information.

The following software is required:
- HACMP for AIX Version 4.4 (or later) or HACMP/ES for AIX Version 4.4 (or later)
- AIX 5L (5.1 and 5.2)

The HACMP Cluster Information Daemon must also be running.

Installing the backup-archive client

Install the Tivoli Storage Manager Backup-Archive client software on a local disk on each node in the cluster you want to participate in an HACMP takeover. The following client configuration files must be stored locally:
- The client executables and related files should reside in the same location on each node in the cluster.
- The API executable and configuration files should reside in the default API installation directory (`/usr/tivoli/tsm/client/api/bin`)
- The system options file (`dsm.sys`) should reside in the default client installation directory (`/usr/tivoli/tsm/client/ba/bin`)

The following client configuration files must be stored externally in a shared disk subsystem so they can be defined as a cluster resource and be available to the takeover node during a failover. Each resource group must have the following configuration:

- The client option file (dsm.opt), include-exclude file, and password file must be placed in a directory on the shared disk.
- The client error log file must be placed on the shared disk volumes to maintain a single continuous error log file.

Configuring the backup-archive client to process local nodes

You can edit your dsm.opt file on each local node to process local disk drives using the following options:

clusternode
Do not specify this option when processing local drives. See "Clusternode" on page 174 for more information.

nodename
If no value is specified, Tivoli Storage Manager uses the local machine name. See "Nodename" on page 257 for more information.

domain
If no value is specified, Tivoli Storage Manager processes all local drives that are not owned by the cluster. See "Domain" on page 194 for more information.

You can also configure the Tivoli Storage Manager Backup-Archive Scheduler Service to back up the local cluster nodes.

Configuring Tivoli Storage Manager backup-archive client to process cluster disk resources

Ensure that Tivoli Storage Manager manages each cluster group that contains physical disk resources as a unique node. This ensures that Tivoli Storage Manager correctly manages all disk resources, regardless of which cluster node owns the resource at the time of back up.

Step 1: Register the client to a server

A Tivoli Storage Manager client in an HACMP cluster must be registered to a Tivoli Storage Manager server with an assigned node name. Consider the following conditions when registering your node name:

- If local volumes that are *not* defined as cluster resources will be backed up, separate node names (and separate client instances) must be used for both non-clustered and clustered volumes.
- The node name used to back up clustered volumes defaults to the cluster name, not the host name. We recommend that you choose a node name related to the cluster resource group to be managed by that node.
- If multiple resource groups are defined in the HACMP environment to failover independently, then separate node names must be defined per resource group.

Step 2: Configure the client system options file

Each node in the HACMP cluster that runs the Tivoli Storage Manager client must have the following settings defined in each respective dsm.sys file:

- Separate server stanzas to back up non-clustered volumes
- Separate server stanzas for each cluster resource group to be backed up

The server stanzas defined to back up non-clustered volumes must have the following special characteristics:

- The value of the **tcpclientaddress** option must be the *service* IP address. This is the IP address used for primary traffic to and from the node.
- If the client will back up and restore non-clustered volumes without being connected to the HACMP cluster, the value of the **tcpclientaddress** option must be the *boot* IP address. This is the IP address used to start the machine (node) before it rejoins the HACMP cluster.

The server stanzas defined to back up clustered volumes must have the following special characteristics:

- **clusternode** *yes*
- The **nodename** value must be related to the resource group. If **nodename** is not specified, the cluster name is used.
- The **tcpclientaddress** option must refer to the service IP address of the HACMP node.
- The **passworddir** option must point to a directory on the shared volumes that are part of the cluster resource group.
- The **errorlogname** and **schedlogname** options must point to files on the shared volumes that are part of the cluster resource group.
- All **inclexcl** statements must point to files on the shared volumes that are part of the cluster resource group.
- Set the **managedservices** statement to indicate that the scheduler (or Web client) should be managed by the client acceptor daemon.

Other options can be set as desired.

Step 3: Configure the client user options file

The client user options file (`dsm.opt`) for the Tivoli Storage Manager client that will manage your clustered file spaces must reside on the shared volumes in the cluster resource group. Define the DSM_CONFIG environment variable to point to this `dsm.opt` file. Make sure the `dsm.opt` file contains the following settings:

- The value of the **servername** option must be the server stanza in the `dsm.sys` file which defines parameters for backing up clustered volumes. The `dsm.sys` file may reside on shared space.
- If the `dsm.sys` file resides on a local disk, each node on the cluster must have a matching stanza.
- Define clustered filespaces to be backed up with the **domain** option.
- Other options can be set as desired.

Defining the client as an HACMP application

The Tivoli Storage Manager client must be defined as an application to HACMP to participate in failover processing. See *HACMP for AIX 4.4.1 Installation Guide*, SC23-4278, for detailed instructions on how to perform this procedure. Following is a summary of this procedure:

1. Start HACMP for AIX system management with the following command:

   ```
   smit hacmp
   ```

2. Select **Cluster Configuration**, **Cluster Resources**, **Define Application Servers**, and **Add an Application Server**.

3. Enter the following field values:

Server Name
> Enter an ASCII text string that identifies the server. You use this name to refer to the application server when you define it as a resource during node configuration. The server name can include alphabetic and numeric characters and underscores. Use no more than 31 characters.

Start Script
> Enter the full path name of the script that starts the server. This script is called by the cluster event scripts and must reside on a local disk. This script must be in the same location on each cluster node that might start the server. The start script is used in the following cases:
>
> a. when HACMP is started and resource groups are activated
>
> b. when a failover occurs and the resource group is started on another node
>
> c. when fallback occurs (a failed node re-enters the cluster) and the resource group is transferred back to the node re-entering the cluster.
>
> A sample start script (StartClusterTsmClient.sh.smp) is provided in the /usr/tivoli/tsm/client/ba/bin directory.

Stop Script
> Enter the full path name of the script that stops the server. This script is called by the cluster event scripts and must reside on a local disk. This script must be in the same location on each cluster node that might stop the server. The stop script is used in the following cases:
>
> a. when HACMP is stopped
>
> b. when a failover occurs due to a component failure in a resource group, the other members are stopped so that the entire group can be restarted on the target node in the failover
>
> c. when a fallback occurs and the resource group is stopped on the node currently hosting it to allow transfer back to the node re-entering the cluster.
>
> A sample stop script (StopClusterTsmClient.sh.smp) is provided in the /usr/tivoli/tsm/client/ba/bin directory.

4. Press Enter to add your information to the HACMP for AIX.
5. Press F10 after the command completes to exit smit and return to the command line. Press F3 to perform other configuration tasks.

The Storage Manager client must be in a resource group with a *cascading* or *rotating* takeover relationship. The client does not support a concurrent access resource group. See *HACMP for AIX 4.4.1 Planning Guide*, SC23-4277, for additional information regarding HACMP topology and strategy.

Creating an HACMP resource group to add a client

You must first create an HACMP resource group so you can add the client to it. The following is a summary of this procedure:

1. Start HACMP for AIX system management with the following command:
   smit hacmp
2. Select **Cluster Configuration**, **Cluster Resources**, **Define Resource Groups**, and **Add a Resource Group**. The Add a Resource Group window is displayed.

3. On the Add a Resource Group window, enter the following field values:

Resource Group Name
> Enter an ASCII text string that identifies the resource group. The resource group name can include alphabetic and numeric characters and underscores. Use no more than 31 characters.

Node Relationship
> Select **Cascading**.

Participating Node Names/Default Node Priority
> Select the node names that are participating in the resource group. Add the nodes in order of priority. The node owner of the resource group should be the first node listed.

4. Click **OK**.
5. Press F10 to exit `smit` and return to the command line. Press F3 to perform other configuration tasks.

The Storage Manager client must be in a resource group with a *cascading* or *rotating* takeover relationship. The client does not support a concurrent access resource group. See *HACMP for AIX 4.4.1 Planning Guide*, SC23-4277, for additional information regarding HACMP topology and strategy.

Adding the client to an HACMP resource group

The Tivoli Storage Manager client must be defined to a cluster resource group. See *HACMP for AIX 4.4.1 Installation Guide*, SC23-4278, for detailed instructions on how to perform this procedure. Following is a summary of how to define resources as part of a resource group:

1. Start HACMP for AIX system management with the following command:

   `smit hacmp`

2. Select **Cluster Configuration**, **Cluster Resources**, and **Change/Show Resources/Attributes for a Resource Group**. Press Enter.
3. Select the desired resource group.
4. Press Enter. The **Configure a Resource Group** screen appears.
5. Enter values that define all the resources you want to add to this resource group.
6. Synchronize cluster resources after entering field values in Step 5. Do this by selecting **Cluster Configuration**, **Cluster Resources**, and **Synchronize Cluster Resources**.
7. Press F10 to exit `smit` and return to the command line. Press F3 to perform other configuration tasks.

The Tivoli Storage Manager client must be added to the resource group that contains the file systems to be backed up. These file systems must also be the same file systems specified by the *domain* option in the `dsm.opt` file defined for this client instance.

Both JFS and NFS file systems can be defined as cluster resources. NFS supports only 2 node clusters in a cascading takeover relationship.

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Glossary

The terms in this glossary are defined as they pertain to the IBM Tivoli Storage Manager library. If you do not find the term you need, refer to the IBM Software Glossary on the Web at this address: http://www.ibm.com/ibm/terminology/. You can also refer to IBM Dictionary of Computing, New York: McGraw-Hill, 1994.

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A

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

access control list (ACL).
1. In computer security, a collection of all access rights for one object.
2. In computer security, a list associated with an object that identifies all the subjects that can access the object and their access rights. For example, an access control list is a list that is associated with a file that identifies the users who can access the file and that identifies the users' access rights to that file.

ACL.   See *access control list*.

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

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

administrative client.   A program that runs on a file server, workstation, or mainframe that administrators use to control and monitor the Tivoli Storage Manager server. Contrast with *backup-archive client*.

administrator.   A user who has been registered to the server. Administrators can be authorized to one or more of the following administrative privilege classes: system, policy, storage, operator, or analyst. Administrators can use the administrative commands and queries allowed by their privileges.

aggregate data transfer rate.   Dividing the total number of bytes transferred by the elapsed processing time calculates the data transfer rate.

archive.   To copy one or more files to a storage pool for long-term storage. Archived files can include descriptive information, and you can retrieve them by archive date, file name, or by description. Contrast with *retrieve*.

archive copy.   A file or group of files that have been archived to the Tivoli Storage Manager server.

archive copy group.   A policy object containing attributes that control the generation, destination, and expiration of archived files. An archive copy group belongs to a management class.

archive retention grace period.   The number of days that Tivoli Storage Manager retains an archived copy when the server is unable to rebind the file to an appropriate management class.

authentication. The process of checking and authorizing a user's password before allowing that user to access the Tivoli Storage Manager server. An administrator with system privilege can enable or disable authentication.

authorization rule. A specification allowing another user to either restore or retrieve a user's files from Tivoli Storage Manager storage.

Authorized User. A user who has administrative authority for the Tivoli Storage Manager client on a workstation. This user changes passwords, performs open registrations, and deletes file spaces. An Authorized User is any user running with a real user ID of 0 (root) or a user who owns an executable whose owner execution permission bit is set to **s**. In the following example, the user **tivoli** is an Authorized User while running `dsmc` since the `dsmc` owner execution permission bit is set to **s**:

```
-rwsr-xr-x  1  tivoli  dsmdev  2880479  Nov  5 13:42  dsmc*
```

automounted file system (AutoFS). A file system managed by an automounter daemon. The automounter daemon monitors a specified directory path and automatically mounts the file system to access data.

B

back up. To copy information to another location to ensure against loss of data. In IBM Tivoli Storage Manager, you can back up user files, the IBM Tivoli Storage Manager database, and storage pools. Contrast with *restore*. See also *incremental* backup.

backup-archive client. A program that runs on a file server, PC, or workstation and provides a means for users to back up, archive, restore, and retrieve files. Contrast with *administrative client*.

backup copy group. A policy object containing attributes controlling the generation, destination, and expiration of backup versions of files. The backup copy group belongs to a management class.

backup retention grace period. The number of days Tivoli Storage Manager retains a backup version when the server is unable to rebind the file to an appropriate management class.

backup version. A file that a user backed up to server storage. More than one backup version can exist in server storage, but only one backup version is the active version. See also *active version* and *inactive* version.

binding. The process of associating a file with a management class name. See also *rebinding*.

boot. To prepare a computer system for operation by loading an operating system.

C

CAD. Client acceptor daemon

central schedule. A function that allows an administrator to schedule client operations and administrative commands. The operations can be scheduled to occur periodically or on a specific date. See *client schedule*.

client. A program running on a PC, workstation, file server, LAN server, or mainframe that requests services of another program, called the server. The following types of clients can obtain services from a Tivoli Storage Manager server: administrative client, application client, API client, backup-archive client, and HSM client (also known as Tivoli Storage Manager for Space Management). See *administrative client* and *backup-archive client*.

client acceptor. A Web client process that is an HTTP daemon that serves the Web client Java applet to the Web browsers. The program that starts the client acceptor process is called dsmcad. On UNIX, the client acceptor is run as a daemon.

client domain. The set of drives, file systems, or volumes that a user selects to back up or archive using the backup-archive client.

client node. A file server or workstation on which the backup-archive client program has been installed, and which has been registered to the server.

client options set. Client option sets allow the Tivoli Storage Manager administrator to specify additional options that may not be included in the client options file (dsm.opt). Client option sets are used in conjunction with client option files on client nodes.

client-polling scheduling mode. A client and server communication technique where the client node queries the server for scheduled work. Contrast with *server-prompted scheduling mode.*

client/server. A communications network architecture in which one or more programs (clients) request computing or data services from another program (the server).

client system options file. An editable file that contains communication, authorization, central scheduling, backup, archive, and space management options. A root user on your workstation sets the options in a client system options file. The file name is **dsm.sys** located in your Tivoli Storage Manager installation directory.

client user options file. A user-editable file containing options that identify the Tivoli Storage Manager server to contact, specify backup, archive, restore, retrieve, and space management options, and set date, time, and number formats. The file name is **dsm.opt** located in your Tivoli Storage Manager installation directory.

closed registration. A registration process in which a Tivoli Storage Manager administrator must register workstations as client nodes with the server. Contrast with *open registration.*

command line interface. A type of user interface where commands are specified on the command line. Contrast with *graphical user interface.*

communication method. The method by which a client and server exchange information. For Tivoli Storage Manager backup-archive clients, the method can be TCP/IP. See *Transmission Control Protocol/Internet Protocol.*

communication protocol. A set of defined interfaces that permits computers to communicate with each other.

copy group. A policy object that contains attributes that control backup and archive file:
- Generation
- Destination
- Expiration.

Backup and archive copy groups belong to management classes. See *frequency*, *destination*, *mode*, *retention*, *serialization*, and *version.*

D

default management class. A management class assigned to a policy set. This class is used to govern backed up or archived files when a user does not explicitly associate a file with a specific management class through the include-exclude list.

destination. A copy group attribute that specifies the storage pool in which to back up or archive a file. At installation, Tivoli Storage Manager provides two storage destinations named **backuppool** and **archivepool**.

domain. See *policy domain* or *client domain.*

drag. Move the mouse while holding down the mouse button, thus moving the selected object.

drag-and-drop. Move (drag) an object on top of another object and release the mouse button, thus relocating the object.

dsm.opt file. See *options file.* See also *client user options file.* Also called client user options file.

dsm.sys file. See *client system options file.*

dynamic. A copy group serialization value that specifies Tivoli Storage Manager accept the first attempt to back up or archive an object, regardless of any changes made during backup or archive processing. See *serialization.* Contrast with *shared static* and *static.*

E

error log. A text file written on disk that contains Tivoli Storage Manager processing error messages. The Tivoli Storage Manager server detects and saves these errors.

exclude. To identify files in an include-exclude list that you do not want to include in a specific client operation, such as backup or archive.

exabyte (EB). (1) For processor storage, real and virtual storage, and channel volume, 1,152,921,504,606,846,976 bytes. (2) For disk storage capacity and communications volume, 1,000,000,000,000,000,000 bytes.

expiration. The process in which files are identified for deletion because their expiration date or retention period is passed. Backups or archives are marked for deletion based on the criteria defined in the backup or archive copy group.

F

file server. A dedicated computer and its peripheral storage devices connected to a local area network that stores both programs and files shared by users on the network.

file space. A logical space on the Tivoli Storage Manager server that contains a group of files. In Tivoli Storage Manager, users can restore, retrieve, or delete file spaces from Tivoli Storage Manager storage. A file space for systems:
- **Windows**— file spaces for removable media are identified by volume label. Fixed drive file spaces are identified by Universal Naming Convention (UNC) name.
- **UNIX** — Logical space that contains a group of files backed up or archived from the same file system, or part of a file system defined with the virtualmountpoint option in the client system options file.

frequency. A copy group attribute that specifies the minimum interval, in days, between incremental backups.

fuzzy backup. A backup version of a file that might not accurately reflect what is currently in the file because the file was backed up at the same time as it was being modified.

fuzzy copy. An archive copy of a file that might not accurately reflect what is currently in the file because Tivoli Storage Manager archived the file while the file was being modified.

G

group backup. Back up of a group containing a list of files from one or more file space origins.

generate password. Processing that stores a new password in an encrypted password file when the old password expires. Automatic generation of a password prevents password prompting. Password generation can be set in the options file (passwordaccess option). See *options file.*

gigabyte (GB). (1) One billion (10^9) bytes. (2) When referring to memory capacity, 1 073 741 824 in decimal notation.

globally unique identifier (GUID). A 16-byte code that identifies an interface to an object across all computers and networks. The identifier is unique because it contains a time stamp and a code based on the network address that is hard-wired on the host computer's LAN interface card.

GPFS node set. A set of AIX SP nodes that can mount a defined group of GPFS file systems.

graphical user interface (GUI). A graphical user interface offers pictorial rather than text-based access to a computer. A graphical user interface includes:
- A combination of graphics and icons
- Use of a mouse or pointing device
- Menu bars, dropdown lists, and overlapping windows

Contrast with *command line interface.* See *windowed interface.*

GUI. Graphical user interface.

H

hierarchical storage management client. A program that runs on a workstation or file server to provide space management services. The hierarchical storage management client automatically migrates eligible files to Tivoli Storage Manager storage to maintain specific levels of free space on local file systems. Automatic recalls are made for migrated files when they are accessed. Users are also permitted to migrate and recall specific files.

HSM. Hierarchical Storage Management.

I

image. A full file system or raw logical volume backup as a single object.

inactive version. A copy of a backup file in Tivoli Storage Manager storage that either is not the most recent version, or the corresponding original file was deleted from the client file system. Inactive backup versions are eligible for expiration according to the management class assigned to the file.

include-exclude file. A file containing statements to determine the files to back up and the associated management classes to use for backup or archive. See *include-exclude list.*

include-exclude list. A list of include and exclude options that include or exclude selected files for backup. An exclude option identifies files that should not be backed up. An include option identifies files that are exempt from the exclusion rules or assigns a management class to a file or a group of files for backup or archive services. The include-exclude list is defined in one or more include-exclude files or in the client system options file (dsm.sys) file. The include-exclude list may contain entries from any or all of the following sources: the client options file (Windows), the client system options file (Unix), separate include-exclude files, or the Tivoli Storage Manager server. See *client system options file.*

incremental backup. A function that permits user to back up new or changed files or directories from a client domain or from specified file systems, directories, or files. These file systems, directories, or files are not excluded in the include-exclude list and meet the requirements for frequency, mode, and serialization as defined by a backup copy group of the management class assigned to each file. Contrast with *selective backup.*

inode. A data structure that describes the individual files in an operating system. There is one inode for each file. The number of inodes in a file system, and therefore the maximum number of files a file system can contain, is set when the file system is created. Hardlinked files share the same inode.

inode number. A number that specifies a particular inode in a file system.

IPL. Initial Program Load. See *boot* and *reboot.*

L

LAN. Local area network.

LAN-free data transfer. The movement of client data between the client and a storage device over a SAN, bypassing the LAN.

Local Area Network (LAN). A variable-sized communications network placed in one location. LAN connects servers, PCs, workstations, a network operating system, access methods, and communications software and links.

logical unit number (LUN). A logical unit number (LUN) is a unique identifier used on a SCSI bus that enables it to differentiate between up to eight separate devices (each of which is a logical unit). Each LUN is a unique number that identifies a specific logical unit, which may be a hard disk, tape drive, or other device which understands the SCSI protocol.

logical volume backup. A back up of a file system or logical volume as a single object

Loopback Virtual File System (LOFS). A file system created by mounting a directory over another local directory, also known as mount-over-mount. A LOFS can also be generated using an automounter.

M

management class. A policy object that is a named collection of copy groups. A management class is associated with a file to specify how the server should manage backup versions or archive copies of workstation files. See *binding* and *copy group*.

mode. A copy group attribute that specifies whether a backup file should be created for a file that was not modified since the last time the file was backed up. See *absolute* and *modified*.

modified. A backup copy group attribute indicating a file is considered for backup only if the file has been changed since the last backup. A file is considered changed if the date, size, owner, or permissions have changed. See *absolute* and *mode*.

N

NAS node. A type of node that is a NAS file server. The NAS node name uniquely identifies the NAS file server and its data to Tivoli Storage Manager. Through support of Network Data Management Protocol (NDMP), Tivoli Storage Manager can efficiently back up and restore NAS file systems to tape drives or libraries that are locally attached to the NAS file servers.

NDMP. Network Data Management Protocol.

Network Attached Storage (NAS) file server. A network attached storage (NAS) device is a specialized file-serving box whose operating system is streamlined and optimized for file-serving functions. Through support of Network Data Management Protocol (NDMP), Tivoli Storage Manager can efficiently back up and restore NAS file systems to tape drives or libraries that are locally attached to the NAS file servers.

Network Data Management Protocol. Open standard network protocol. Enables efficient back up and restore of Network Attached Storage (NAS) file systems to tape drives or libraries that are locally attached to the NAS file servers.

network data transfer rate. The data transfer rate calculated by dividing the total number of bytes transferred by the data transfer time. For example, the time spent transferring data over the network.

node. See *client node*.

node name. A unique name used to identify a workstation, file server, or PC to the server.

O

open registration. A registration process in which users can register their own workstations or PCs as client nodes with the server. Contrast with *closed registration*.

options file. A file that contains processing options.
- **dsm.opt**

  Identifies the Tivoli Storage Manager server to contact, specifies backup, archive, restore, and retrieve options. Also called the client user options file.
- **dsm.sys**

  Contains stanzas describing Tivoli Storage Manager servers to contact for services. These stanzas also specify communication methods, backup and archive options, and scheduling options. Also called the client system options file.

owner. The owner of backup-archive files sent from a multi-user client node, such as AIX.

P

pattern-matching character. See *wildcard character*.

plug-in. A self-contained software component that modifies (adds or changes) function in a particular software system. When you add a plug-in to a software system, the foundation of the original software system remains intact.

policy domain. A policy object that contains one or more policy sets. Client nodes are associated with a policy domain. See *policy set*, *management class*, and *copy group*.

policy set. A policy object that contains a group of management class definitions that exist for a policy domain. At any one time, there can be many policy sets within a policy domain, but only one policy set can be active. See *active policy set* and *management class*.

progress indicator. A control used to inform a user about the progress of a process.

R

raw logical volume. A portion of a physical volume which is comprised of unallocated blocks and has no Journaled File System (JFS) definition. A raw logical volume is read/write accessible only through low level I/O functions.

rebinding. The process of associating a backup with a new management class name. For example, rebinding occurs when the management class associated with a file is deleted. See also *binding*.

reboot. To restart the operating system.

registration. The process of identifying a client node or administrator to the server by specifying a user ID, password, and contact information. For client nodes, a policy domain, compression status, and deletion privileges are also specified.

restore. A function that permits users to copy a version of a backup file from the storage pool to a workstation or file server. The backup copy in the storage pool is not affected. Contrast with *backup*.

retention. The amount of time, in days, that inactive backed up or archived files are retained in the storage pool before they are deleted. The following copy group attributes define retention: retain extra versions, retain only version, retain version.

retrieve. A function permitting users to copy an archived file from the storage pool to the workstation or file server. The archive copy in the storage pool is not affected. Contrast with *archive*.

root user (UNIX). The authority level for a root user permits this user to do authorized tasks for Tivoli Storage Manager.

S

SAN. Storage area network.

scheduling mode. The type of scheduling operation for the client-server node. Tivoli Storage Manager supports two scheduling modes: client-polling and server-prompted.

scroll. Move through a list of items in a window by operating the scrollbars with the mouse cursor.

select. Choose an item from a list or group of items.

selective backup. A function permitting users to back up specified files. These files are not excluded in the include-exclude list and meet the requirement for serialization in the backup copy group of the management class assigned to each file. Contrast with *incremental backup*.

serialization. A copy group attribute that specifies whether a file can be modified during a backup or archive operation. See *static*, *dynamic*, *shared static*, and *shared dynamic*.

server. A program running on a mainframe, workstation, or file server that provides shared services such as backup and archive to other various (often remote) programs (called clients).

server-prompted scheduling mode. A client-server communication technique where the server contacts the client node when tasks need to be done. Contrast with *sclient-polling scheduling mode*.

session. A period of time in which a user can communicate with a server to perform backup, archive, restore, or retrieve requests.

shared dynamic. A Tivoli Storage Manager copy group serialization mode. This mode specifies if a file changes during backup or archive and continues to change after a number of retries. The last retry commits the file to the Tivoli Storage Manager server whether or not the file changed during backup or archive. Contrast with *dynamic*, *shared static*, and *static*.

shared static. A copy group serialization value specifying that a file must not be modified during a backup or archive operation. Tivoli Storage Manager attempts to retry the operation a number of times. If the file is in use during each attempt, the file is not backed up or archived. See *serialization*. Contrast with *dynamic*, *shared dynamic*, and *static*.

share point. A drive or directory on Windows 2000, XP, and .NET whose files are available for shared access across a network. The share point name is part of a UNC name. See *Universal Naming Convention (UNC)* name.

shift-click. Click on an item while pressing the Shift key.

space management. The process of keeping sufficient free storage space available on a local file system for new data and making the most efficient and economical use of distributed storage resources.

sparse file. A file that is created with a length greater than the data it contains, leaving empty spaces for future addition of data.

special files. Special files define devices for the system or temporary files created by processes. There are three basic types of special files: FIFO (first-in, first-out), block, and character. FIFO files are also called pipes. Pipes are created by one process to temporarily allow communication with another process. These files cease to exist when the first process finishes. Block and character files define devices. Tivoli Storage Manager processes only device and named pipe special files. Socket special files are not processed.

snapshot image backup. During an snapshot image backup, the volume is available to other system applications during the operation.

stabilized file space. A file space that exists on the server but not on the client. This situation can arise in at least two instances:
1. A drive is removed from a client workstation
2. A file space is renamed on the server

Stabilized file spaces remain on the server until deleted by the user or administrator. Files and directories can be restored and retrieved from a stabilized file space. However, it is not possible to back up or archive data to a stabilized file space.

stanza. In the AIX OS, a stanza is a group of lines in a file that together have a common function or define a part of the system. The Tivoli Storage Manager Client System Options file (**dsm.sys**) contains a stanza for each server to which the client can connect. Each stanza begins with the *servername* option and ends at the next *servername* option or the end of file, whichever comes first. Each stanza must include communications options.

static. A copy group serialization value specifying that a file must not be modified during a backup or archive operation. If the file is in use during the first attempt, Tivoli Storage Manager will not back up or archive the file. See *serialization*. Contrast with *dynamic*, *shared dynamic*, and *shared static*.

storage area network (SAN). A high-speed communications network optimized for storage.

storage agent. A program that enables Tivoli Storage Manager to back up and restore client data directly to and from SAN-attached storage.

storage pool. A named set of storage volumes used as the destination of backup, archive, or migrated copies.

T

TCA. Trusted Communications Agent

TCP/IP. Transmission Control Protocol/Internet Protocol.

timeout. A time event involving:
- An event that happens at the end of a predetermined period of time that began at the happening of another specified event.

- A time interval allotted for certain operations to happen. For example, response to polling or addressing before system operation is interrupted and must be restarted.
- A terminal feature that logs off a user if an entry is not made within a specified period of time.

Tivoli Storage Manager. A client-server licensed program product that provides storage management and data access services to customers in a multivendor computer environment.

Transmission Control Protocol/Internet Protocol (TCP/IP). A standard set of communication protocols that supports peer-to-peer connectivity of functions for both local and wide-area networks.

Trusted Communications Agent (TCA). A program that can handle the sign-on password protocol when password access is generated. The main process (for example, *dsmj*, *dsmc*) makes a run time decision based on the password access option setting, the user ID, and the executables' access privileges to run this program. The file that contains this program must have the 's' bit set in its mode field and the owner must be root.

V

version. Storage management policy may allow back-level copies of backed up objects to be kept at the server whenever an object is newly backed up. The most recent backed up copy is called the ″active″ version. Earlier copies are ″inactive″ versions. The following backup copy group attributes define version criteria: versions data exists, and versions data deleted.

W

wildcard character. An asterisk (*) or question mark (?) character used to represent multiple (*) or single (?) characters when searching for various combinations of characters in alphanumeric and symbolic names.

windowed interface. A type of user interface that is either a graphical user interface or a text-based interface. The text-based interface maintains a close affinity to the graphical user interface, including action bars and their associated pull-down menus and windows. See *graphical user interface*.

workstation. A programmable high-level workstation (usually on a network) with its own processing hardware such as a high-performance personal computer. In a local area network, a personal computer that acts as a single user or client. A workstation can also be used as a server.

world wide name. A unique 48 or 64 bit number assigned by a recognized naming authority (often via block assignment to a manufacturer) that identifies a connection or a set of connections to the network. Abbreviated WWN. A WWN is assigned for the life of a connection (device). Most networking technologies (e.g., Ethernet, FDDI, etc.) use a world wide name convention.

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